MITSUBISHI ELECTRIC

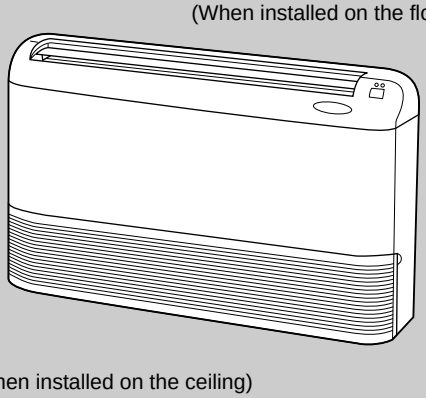
FLOOR AND CEILING TYPE AIR CONDITIONERS

No. OB240

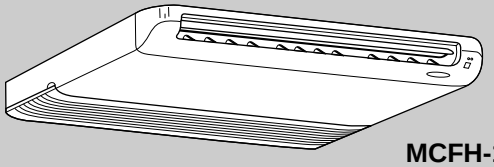
SERVICE MANUAL

Wireless type
Model
MCFH-13NV-E3(WH) · MUCFH-13NV-E3

(When installed on the floor)



(When installed on the ceiling)



MCFH-13NV -E3

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Refer to the Service Manual OB227 REVISED EDITION-B when MCFH-13NV-E3 is connected with MXZ-32RV-E1 as multi system units.

1 TECHNICAL CHANGES

MCFH-13NV -E2→MCFH-13NV -E3

1. Indoor model name has changed.
2. MCFH-13NV-E3 became possible to connect with MXZ-32RV-E1 as multi system units.

MUCFH-13NV -E2→MUCFH-13NV -E3

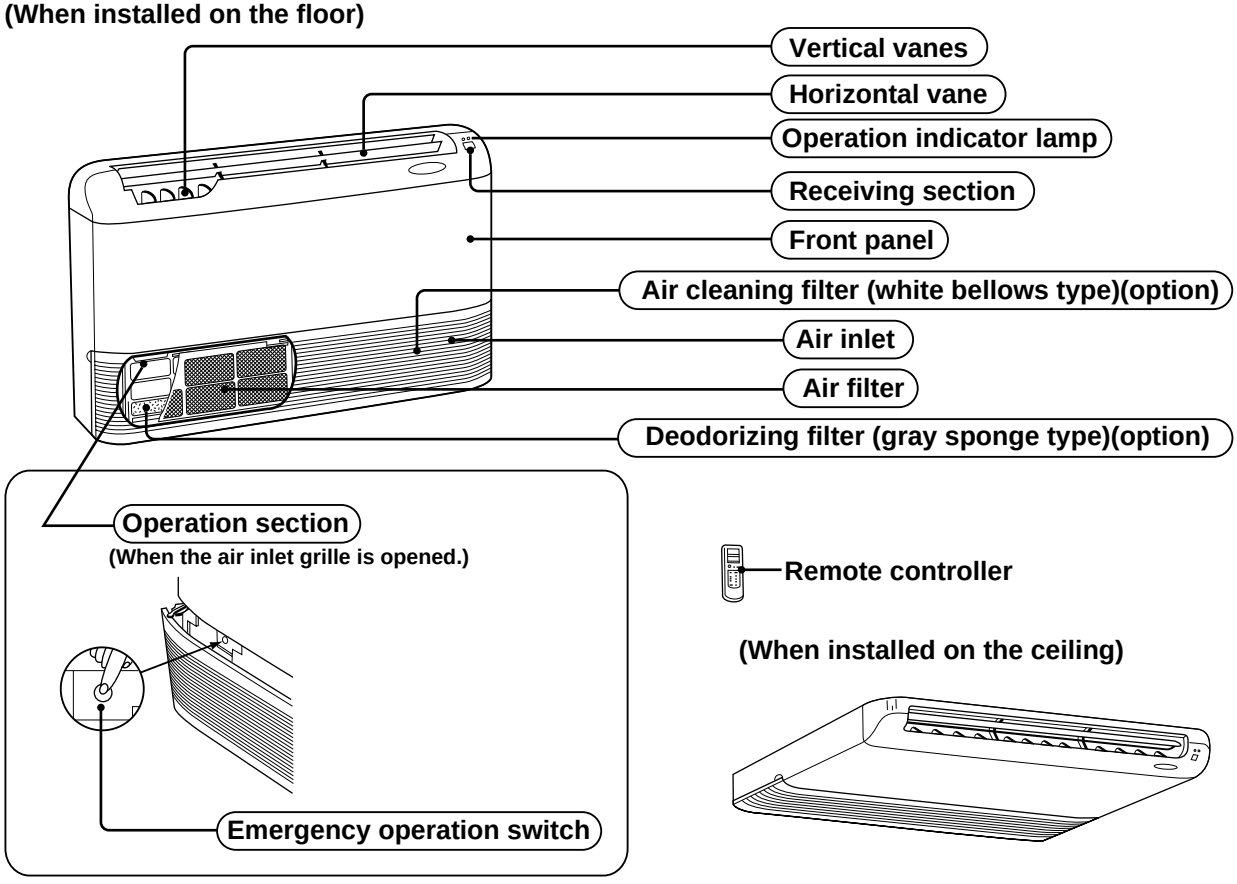
1. Outdoor model has changed.

2 PART NAMES AND FUNCTIONS

MCFH-13NV -E3

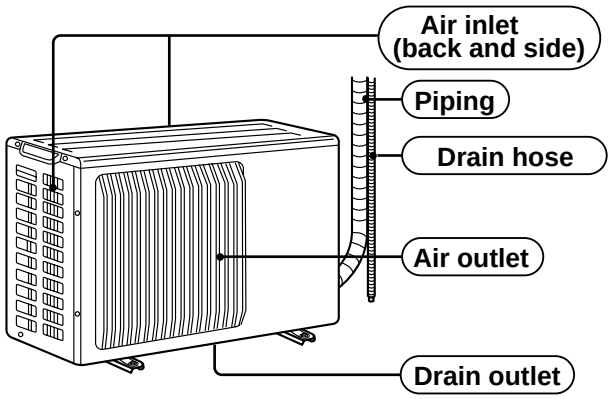
INDOOR UNIT

(When installed on the floor)



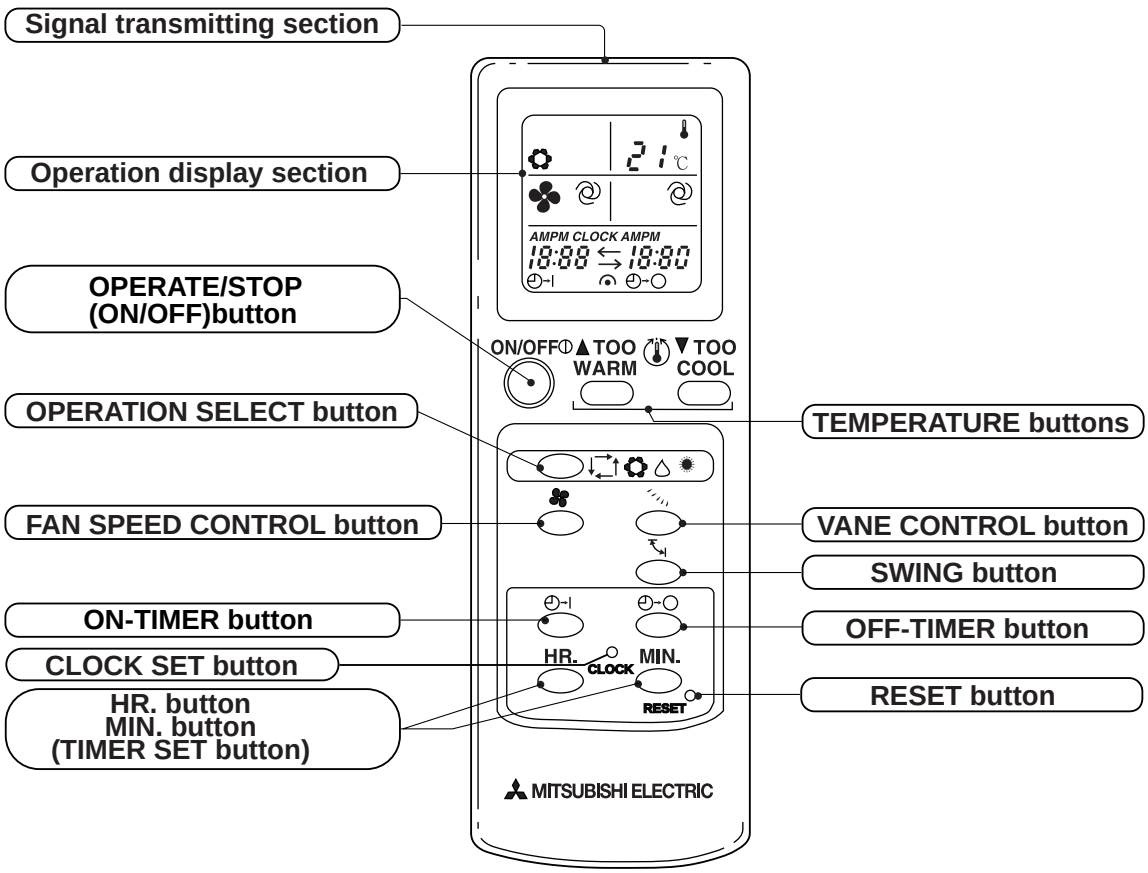
MUCFH-13NV - E3

OUTDOOR UNIT



MCFH-13NV - E3

REMOTE CONTROLLER



3 SPECIFICATION

※Refer to the Service Manual OB227 REVISED EDITION-B when MCFH-13NV-E3 is connected with MXZ-32RV-E1 as multi system units.

Model				MCFH-13NV-E3		※MCFH-13NV-E3 (INDOOR UNIT)	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase, 220-240V, 50Hz		Single phase, 220-240V, 50Hz	
Capacity	Capacity		kW	3.7	4.0	—	
	Dehumidification		ℓ/h	1.5	—	—	
	Air flow		m³/h	780		780	
Electrical data	Power outlet		A	10		10	
	Running current		A	6.2-6.4	5.4-5.8	0.3	
	Power input		W	1,310-1,400	1,130-1,220	66	
	Auxiliary heater		A(kW)	—	—	—	
	Power factor		%	96-91	95-88	100-92	
	Starting current		A	35-38		—	
	Compressor motor current		A	5.54-5.72	4.74-5.12	—	
	Fan motor current		A	0.66-0.68		0.30	
Coefficient of performance(C.O.P)				2.82-2.64	3.54-3.28	—	
Compressor	Model			RH-231VHAT		—	
	Output		W	1,100		—	
	Winding resistance (at 20℃)		Ω	C-R2.11 C-S3.97		—	
Indoor fan motor	Model			RB4V25-AA or AB		RB4V25-AA or AB	
	Winding resistance (at 20℃)		Ω	WHT-BLK 182.2 BLK-YLW 68.9 YLW-BLU 47.5 BLU-BRN 31.5 BRN-RED 22.9		WHT-BLK 182.2 BLK-YLW 68.9 YLW-BLU 47.5 BLU-BRN 31.5 BRN-RED 22.9	
Outdoor fan motor	Model			RA6V33-CA		—	
	Winding resistance (at 20℃)		Ω	WHT-BLK 176 BLK-RED 413		—	
Dimensions	Indoor unit	Width	mm	1100		1100	
		Height	mm	650		650	
		Depth	mm	180		180	
	Outdoor unit	Width	mm	780		—	
		Height	mm	540		—	
		Depth	mm	255		—	
Weight	Indoor unit		kg	26		26	
	Outdoor unit		kg	38		—	
Special remarks	Air direction			5		5	
	Sound level (Hi)	Indoor unit	dB	46-47		46-47	
		Outdoor unit	dB	49		—	
	Fan speed (Hi)	Indoor unit	rpm	1,120-1,260		1120-1260	
		Outdoor unit	rpm	700-740		—	
	Fan speed regulator	Indoor unit		3		3	
		Outdoor unit		1		—	
	Refrigerant filling capacity(R-22)		kg	1.35		—	
	Refrigerating machine oil (Model)		cc	520 <MS56>		—	
	Thermistor	RT11(at 25℃)	kΩ	10		10	
		RT12(at 25℃)	kΩ	10		10	
		RT61(at 0℃)	kΩ	33.18		—	

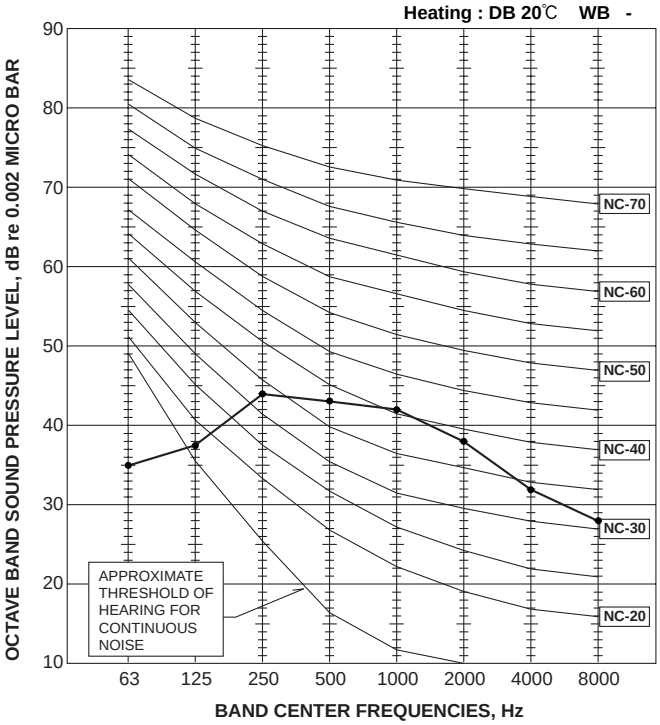
NOTE:Test conditions Cooling : Indoor DB27°C WB19°C Outdoor DB35°C WB24°C Heating : Indoor DB20°C WB — Outdoor DB 7°C WB 6°C

4 NOISE CRITERIA CURVES

MCFH-13NV - E3

NOTCH	SPL(dB(A))	LINE
Hi (220-240V)	46-47	●——●

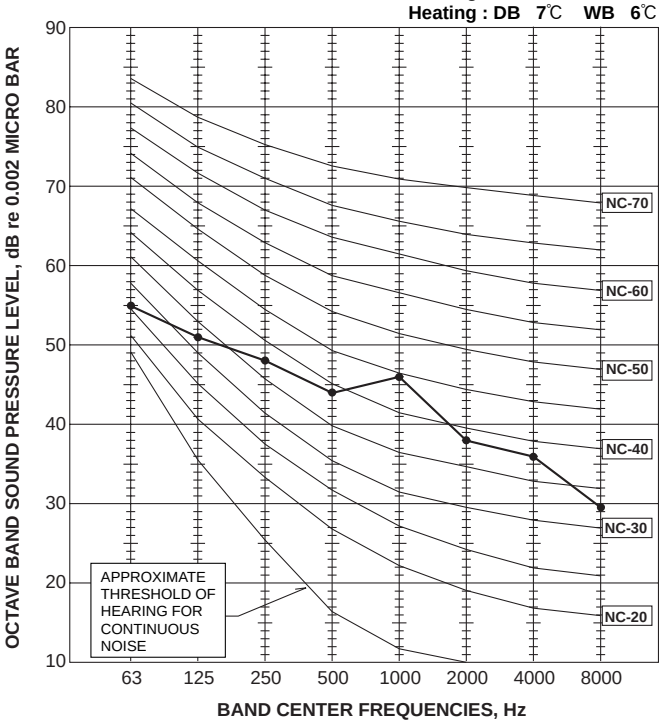
Test conditions,
Cooling : DB 27℃ WB 19℃
Heating : DB 20℃ WB -



MUCFH-13NV - E3

NOTCH	SPL(dB(A))	LINE
Hi (220-240V)	49	●——●

Test conditions,
Cooling : DB 35℃ WB 24℃
Heating : DB 7℃ WB 6℃

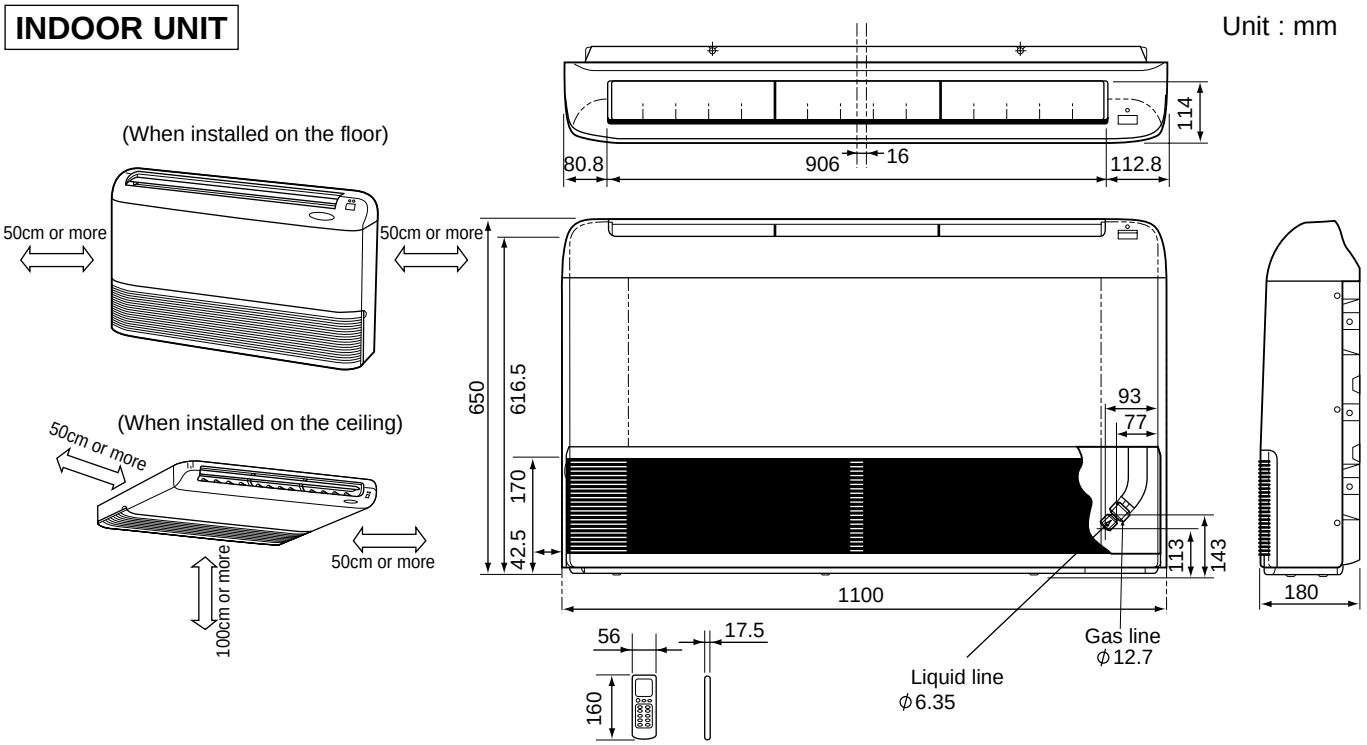


5 OUTLINES AND DIMENSIONS

MCFH-13NV - E3

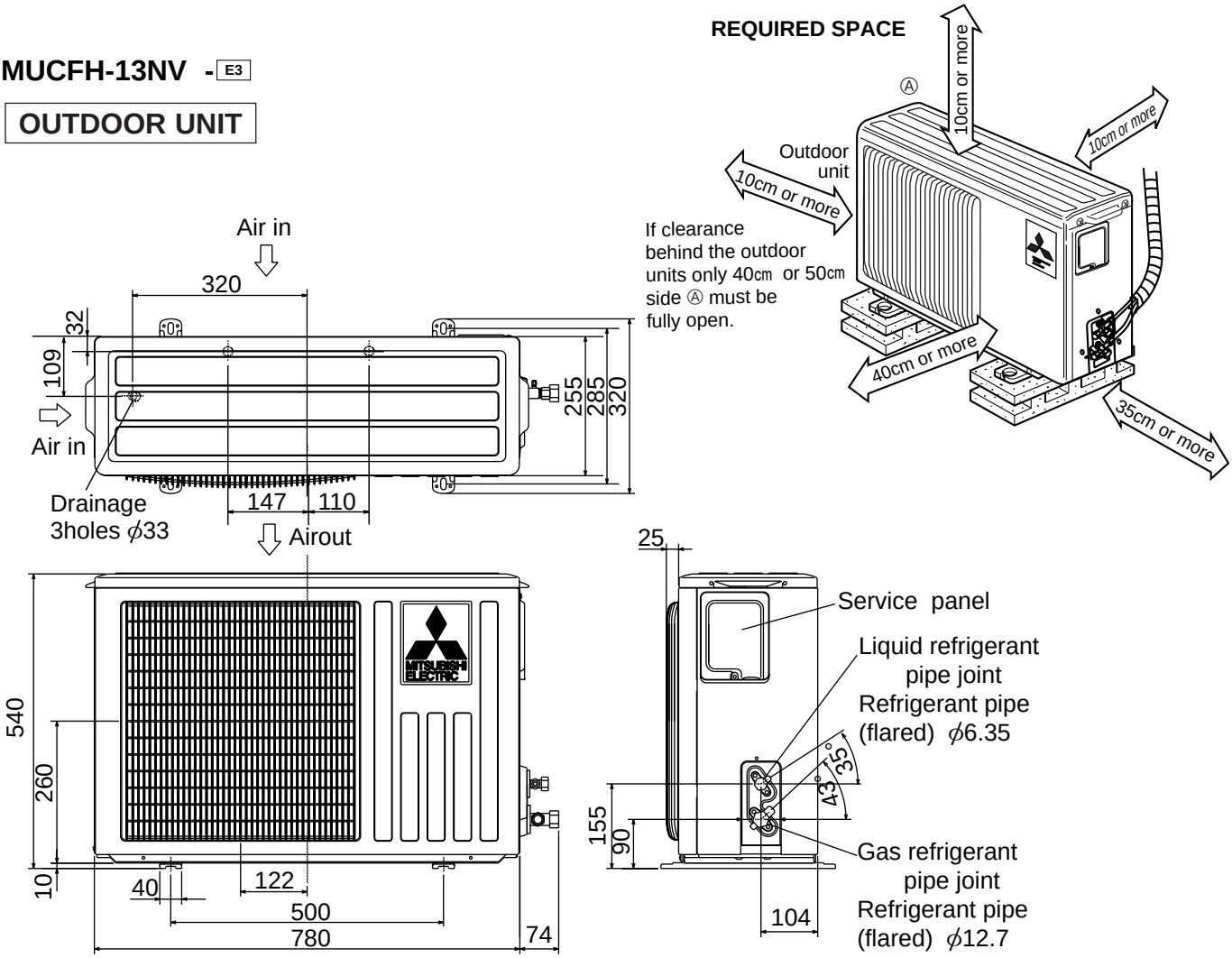
INDOOR UNIT

Unit : mm



MUCFH-13NV - E3

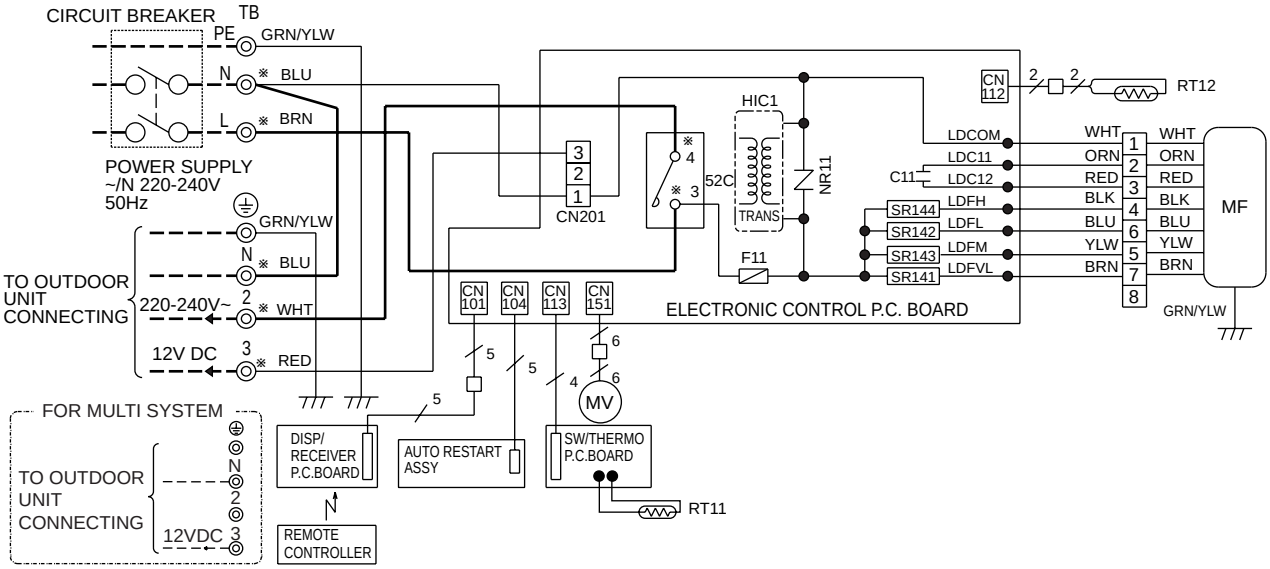
OUTDOOR UNIT



6 WIRING DIAGRAM

MCFH-13NV - E3 MODEL WIRING DIAGRAM

INDOOR UNIT

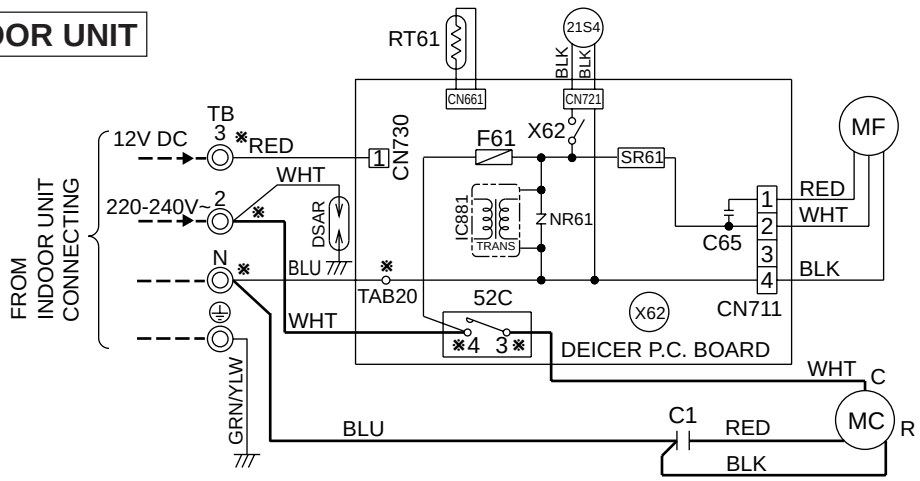


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV	VANE MOTOR	SR141~ SR144	SOLID STATE RELAY
F11	FUSE (3.15A)	NR11	VARISTOR		
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR	TB	TERMINAL BLOCK
MF	INDOOR FAN MOTOR(INNER FUSE)	RT12	COIL TEMPERATURE THERMISTOR	52C	CONTACTOR

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
2. Use copper conductors only.(For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

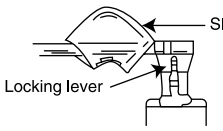
MUCFH-13NV - E3 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR(INNER THERMOSTAT)	TB	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR(INNER THERMOSTAT)	X62	REVERSING VALVE COIL RELAY
DSAR	SURGE ABSORBER	NR61	VARISTOR	21S4	REVERSING VALVE COIL
F61	FUSE(2A)	RT61	DEFROST THERMISTOR	52C	CONTACTOR
IC881	DC/DC CONVERTER	SR61	SOLID STATE RELAY		

NOTE :1. Use copper conductors only.(For field wiring)
2. Symbols below indicate.
◎:Terminal block, □□□□: Connector
3. "※" shows the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.

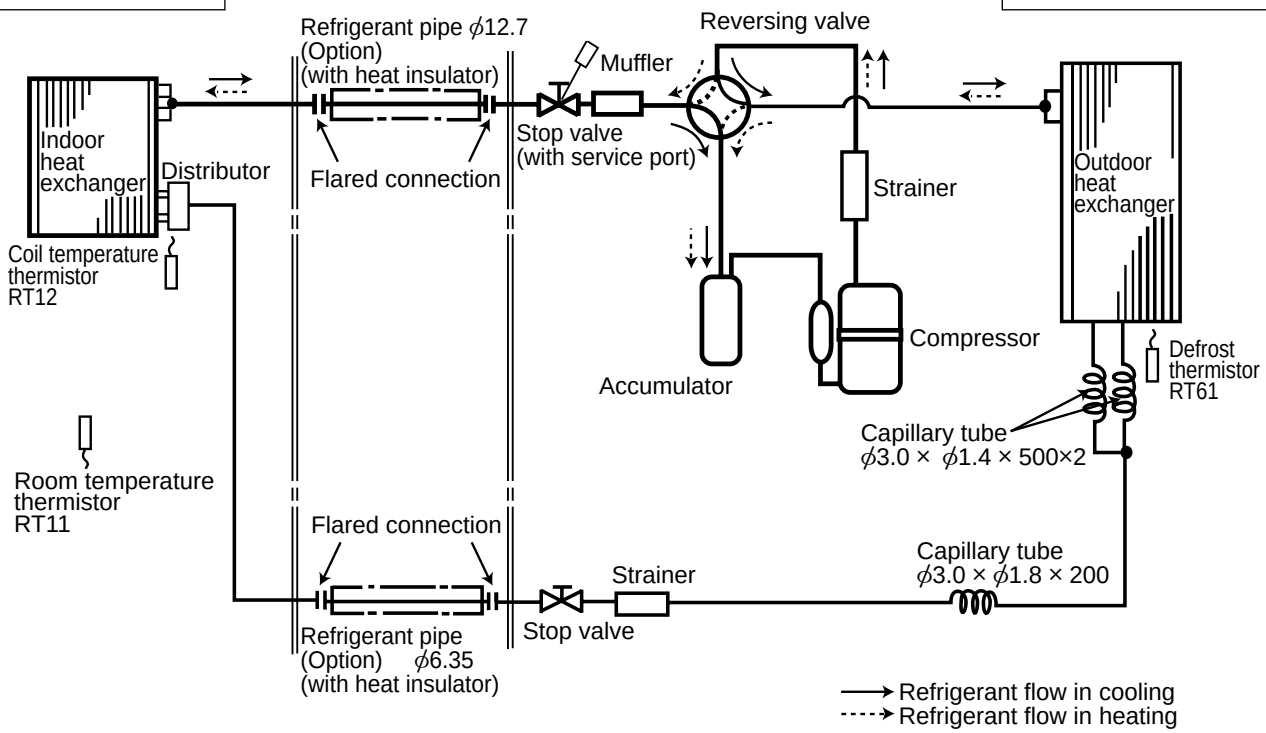


①Slide the sleeve.
②Pull the wire while pushing the locking lever.

7 REFRIGERANT SYSTEM DIAGRAM

MCFH-13NV - E3 **MUCFH-13NV - E3**

INDOOR UNIT **OUTDOOR UNIT**

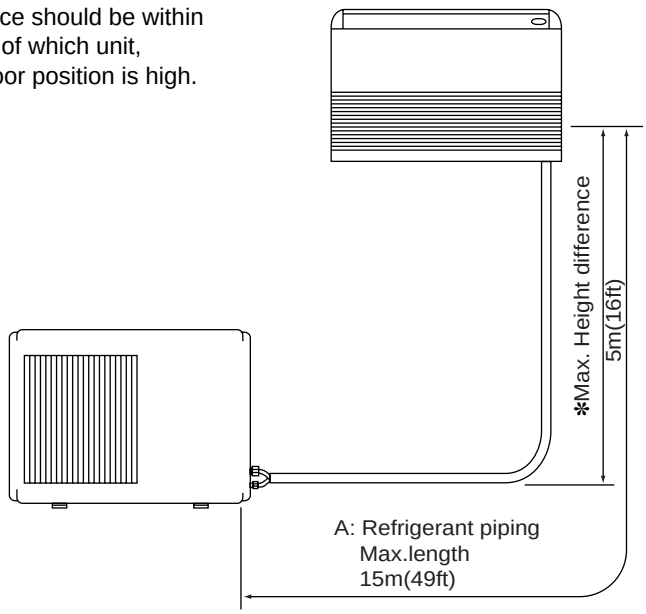


MAX. REFRIGERANT PIPING LENGTH & MAX. HEIGHT DIFFERENCE

Model	Length : m (ft)	Piping size O.D : mm(in.)	
	A	Gas	Liquid
MCFH-13NV - E3	15(49)	ϕ12.7(1/2)	ϕ6.35(1/4)

MAX. HEIGHT DIFFERENCE

✻Height difference should be within 5m regardless of which unit, indoor or outdoor position is high.



ADDITIONAL REFRIGERANT CHARGE (R-22 : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)								
		7m	8m	9m	10m	11m	12m	13m	14m	15m
MCFH-13NV - E3	1,350	0	50	100	150	200	250	300	350	400

Calculation : Xg=50g/mx(A-7)m

8 PERFORMANCE CURVES

MCFH-13NV - E3

The standard data contained in these specifications apply only to the operation of the air conditioner under normal condition, since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

Rated voltage : ±10% (198~264V), 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

COOLING

(1) Indoor intake air wet-bulb temperature : ˚CWB
(2) Indoor outlet air wet-bulb temperature : ˚CWB
(3) Outdoor intake air dry-bulb temperature : ˚CDB
(4) Total input : W

HEATING

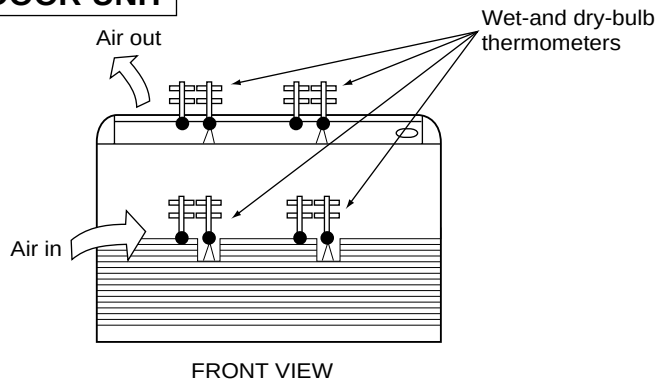
(1) Indoor intake air dry-bulb temperature : ˚CDB
(2) Indoor outlet air dry-bulb temperature : ˚CDB
(3) Outdoor intake air wet-bulb temperature : ˚CWB
(4) Total input : W

Indoor air wet/dry-bulb temperature difference on the left side of the chart on this page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

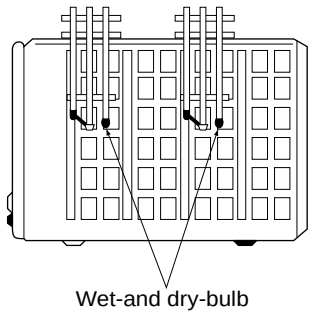
1. Attach at least 2 sets of wet-and-dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and-dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet-and-dry-bulb thermometers to the outdoor air intake.
   Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of the room.
5. Press the EMERGENCY OPERATION switch once(twice) to start the EMERGENCY COOL(HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.

INDOOR UNIT

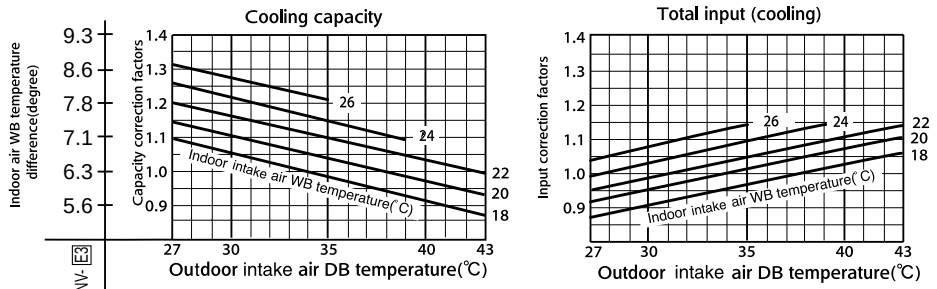


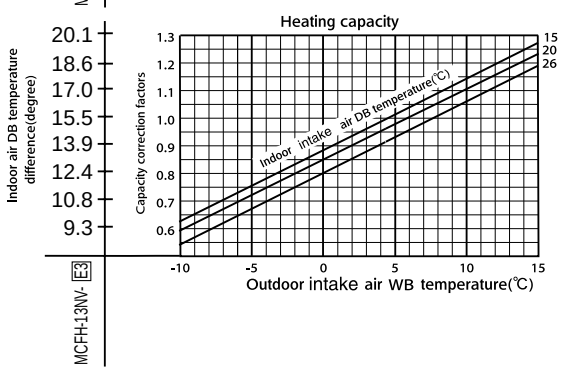
FRONT VIEW

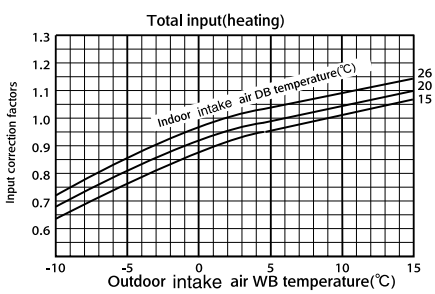
OUTDOOR UNIT



BACK VIEW







OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

COOL operation

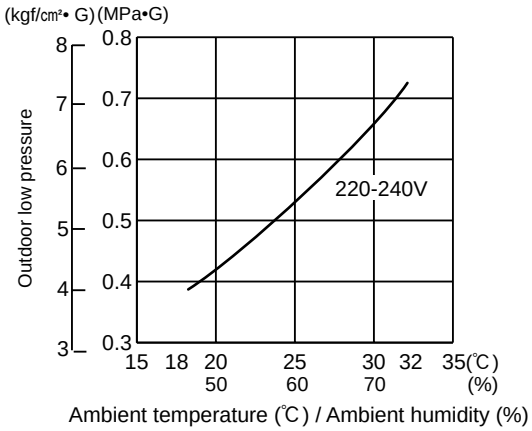
① Both indoor and outdoor units are under the same temperature/humidity condition.

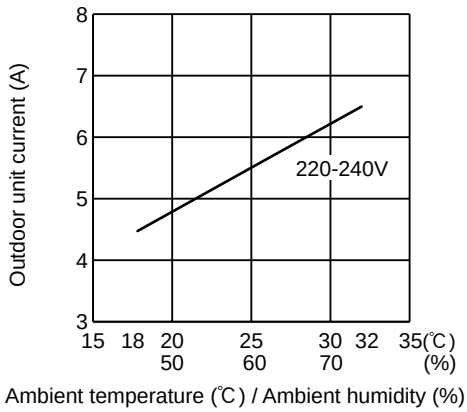
Dry Bulb temperature (˚C)	Relative humidity (%)
20	50
25	60
30	70

② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa • G) =10.2(kgf/㎠ • G)**

MUCFH-13NV - E3

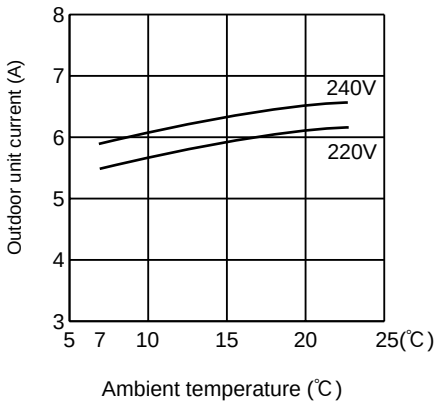




HEAT operation

Condition Indoor : Dry bulb temerature 20.0℃
Wet bulb temerature 14.5℃

Outdoor : Dry bulb temerature 7,15,20℃
Wet bulb temerature 6,12,14.5℃



PERFORMANCE DATA
COOL operation(220V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 3.7 kW INPUT : 1310 W SHF : 0.72

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.35	2.35	0.54	1048	4.16	2.25	0.54	1100	4.00	2.16	0.54	1153	3.85	2.08	0.54	1205
21	20	4.53	1.90	0.42	1100	4.35	1.83	0.42	1166	4.22	1.77	0.42	1192	4.07	1.71	0.42	1245
22	18	4.35	2.52	0.58	1048	4.16	2.41	0.58	1100	4.00	2.32	0.58	1153	3.85	2.23	0.58	1205
22	20	4.53	2.08	0.46	1100	4.35	2.00	0.46	1166	4.22	1.94	0.46	1192	4.07	1.87	0.46	1245
22	22	4.72	1.60	0.34	1140	4.55	1.55	0.34	1212	4.44	1.51	0.34	1245	4.26	1.45	0.34	1297
23	18	4.35	2.70	0.62	1048	4.16	2.58	0.62	1100	4.00	2.48	0.62	1153	3.85	2.39	0.62	1205
23	20	4.53	2.27	0.50	1100	4.35	2.17	0.50	1166	4.22	2.11	0.50	1192	4.07	2.04	0.50	1245
23	22	4.72	1.79	0.38	1140	4.55	1.73	0.38	1212	4.44	1.69	0.38	1245	4.26	1.62	0.38	1297
24	18	4.35	2.87	0.66	1048	4.16	2.75	0.66	1100	4.00	2.64	0.66	1153	3.85	2.54	0.66	1205
24	20	4.53	2.45	0.54	1100	4.35	2.35	0.54	1166	4.22	2.28	0.54	1192	4.07	2.20	0.54	1245
24	22	4.72	1.98	0.42	1140	4.55	1.91	0.42	1212	4.44	1.86	0.42	1245	4.26	1.79	0.42	1297
24	24	4.96	1.49	0.30	1192	4.77	1.43	0.30	1258	4.66	1.40	0.30	1297	4.51	1.35	0.30	1362
25	18	4.35	3.04	0.70	1048	4.16	2.91	0.70	1100	4.00	2.80	0.70	1153	3.85	2.69	0.70	1205
25	20	4.53	2.63	0.58	1100	4.35	2.52	0.58	1166	4.22	2.45	0.58	1192	4.07	2.36	0.58	1245
25	22	4.72	2.17	0.46	1140	4.55	2.09	0.46	1212	4.44	2.04	0.46	1245	4.26	1.96	0.46	1297
25	24	4.96	1.69	0.34	1192	4.77	1.62	0.34	1258	4.66	1.59	0.34	1297	4.51	1.53	0.34	1362
26	18	4.35	3.22	0.74	1048	4.16	3.08	0.74	1100	4.00	2.96	0.74	1153	3.85	2.85	0.74	1205
26	20	4.53	2.81	0.62	1100	4.35	2.70	0.62	1166	4.22	2.62	0.62	1192	4.07	2.52	0.62	1245
26	22	4.72	2.36	0.50	1140	4.55	2.28	0.50	1212	4.44	2.22	0.50	1245	4.26	2.13	0.50	1297
26	24	4.96	1.88	0.38	1192	4.77	1.81	0.38	1258	4.66	1.77	0.38	1297	4.51	1.72	0.38	1362
26	26	5.11	1.33	0.26	1258	4.96	1.29	0.26	1323	4.88	1.27	0.26	1362	4.74	1.23	0.26	1402
27	18	4.35	3.39	0.78	1048	4.16	3.25	0.78	1100	4.00	3.12	0.78	1153	3.85	3.00	0.78	1205
27	20	4.53	2.99	0.66	1100	4.35	2.87	0.66	1166	4.22	2.78	0.66	1192	4.07	2.69	0.66	1245
27	22	4.72	2.55	0.54	1140	4.55	2.46	0.54	1212	4.44	2.40	0.54	1245	4.26	2.30	0.54	1297
27	24	4.96	2.08	0.42	1192	4.77	2.00	0.42	1258	4.66	1.96	0.42	1297	4.51	1.90	0.42	1362
27	26	5.11	1.53	0.30	1258	4.96	1.49	0.30	1323	4.88	1.47	0.30	1362	4.74	1.42	0.30	1402
28	18	4.35	3.56	0.82	1048	4.16	3.41	0.82	1100	4.00	3.28	0.82	1153	3.85	3.16	0.82	1205
28	20	4.53	3.17	0.70	1100	4.35	3.04	0.70	1166	4.22	2.95	0.70	1192	4.07	2.85	0.70	1245
28	22	4.72	2.74	0.58	1140	4.55	2.64	0.58	1212	4.44	2.58	0.58	1245	4.26	2.47	0.58	1297
28	24	4.96	2.28	0.46	1192	4.77	2.20	0.46	1258	4.66	2.14	0.46	1297	4.51	2.08	0.46	1362
28	26	5.11	1.74	0.34	1258	4.96	1.69	0.34	1323	4.88	1.66	0.34	1362	4.74	1.61	0.34	1402
29	18	4.35	3.74	0.86	1048	4.16	3.58	0.86	1100	4.00	3.44	0.86	1153	3.85	3.31	0.86	1205
29	20	4.53	3.35	0.74	1100	4.35	3.22	0.74	1166	4.22	3.12	0.74	1192	4.07	3.01	0.74	1245
29	22	4.72	2.92	0.62	1140	4.55	2.82	0.62	1212	4.44	2.75	0.62	1245	4.26	2.64	0.62	1297
29	24	4.96	2.48	0.50	1192	4.77	2.39	0.50	1258	4.66	2.33	0.50	1297	4.51	2.26	0.50	1362
29	26	5.11	1.94	0.38	1258	4.96	1.88	0.38	1323	4.88	1.86	0.38	1362	4.74	1.80	0.38	1402
30	18	4.35	3.91	0.90	1048	4.16	3.75	0.90	1100	4.00	3.60	0.90	1153	3.85	3.46	0.90	1205
30	20	4.53	3.54	0.78	1100	4.35	3.39	0.78	1166	4.22	3.29	0.78	1192	4.07	3.17	0.78	1245
30	22	4.72	3.11	0.66	1140	4.55	3.00	0.66	1212	4.44	2.93	0.66	1245	4.26	2.81	0.66	1297
30	24	4.96	2.68	0.54	1192	4.77	2.58	0.54	1258	4.66	2.52	0.54	1297	4.51	2.44	0.54	1362
30	26	5.11	2.14	0.42	1258	4.96	2.08	0.42	1323	4.88	2.05	0.42	1362	4.74	1.99	0.42	1402
31	18	4.35	4.09	0.94	1048	4.16	3.91	0.94	1100	4.00	3.76	0.94	1153	3.85	3.62	0.94	1205
31	20	4.53	3.72	0.82	1100	4.35	3.56	0.82	1166	4.22	3.46	0.82	1192	4.07	3.34	0.82	1245
31	22	4.72	3.30	0.70	1140	4.55	3.19	0.70	1212	4.44	3.11	0.70	1245	4.26	2.98	0.70	1297
31	24	4.96	2.88	0.58	1192	4.77	2.77	0.58	1258	4.66	2.70	0.58	1297	4.51	2.62	0.58	1362
31	26	5.11	2.35	0.46	1258	4.96	2.28	0.46	1323	4.88	2.25	0.46	1362	4.74	2.18	0.46	1402
32	18	4.35	4.26	0.98	1048	4.16	4.08	0.98	1100	4.00	3.92	0.98	1153	3.85	3.77	0.98	1205
32	20	4.53	3.90	0.86	1100	4.35	3.74	0.86	1166	4.22	3.63	0.86	1192	4.07	3.50	0.86	1245
32	22	4.72	3.49	0.74	1140	4.55	3.37	0.74	1212	4.44	3.29	0.74	1245	4.26	3.15	0.74	1297
32	24	4.96	3.07	0.62	1192	4.77	2.96	0.62	1258	4.66	2.89	0.62	1297	4.51	2.80	0.62	1362
32	26	5.11	2.55	0.50	1258	4.96	2.48	0.50	1323	4.88	2.44	0.50	1362	4.74	2.37	0.50	1402

NOTE Q : Total capacity (kW) SHF : Sensible heat factor
SHC : Sensible heat capacity (kW) INPUT : Total power input (W)

PERFORMANCE DATA
COOL operation(220V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 3.7 kW INPUT : 1310 W SHF : 0.72

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.63	1.96	0.54	1284	3.33	1.80	0.54	1362	3.20	1.73	0.54	1389
21	20	3.81	1.60	0.42	1336	3.55	1.49	0.42	1402	3.42	1.44	0.42	1441
22	18	3.63	2.10	0.58	1284	3.33	1.93	0.58	1362	3.20	1.86	0.58	1389
22	20	3.81	1.75	0.46	1336	3.55	1.63	0.46	1402	3.42	1.57	0.46	1441
22	22	4.03	1.37	0.34	1389	3.77	1.28	0.34	1467	3.64	1.24	0.34	1493
23	18	3.63	2.25	0.62	1284	3.33	2.06	0.62	1362	3.20	1.98	0.62	1389
23	20	3.81	1.91	0.50	1336	3.55	1.78	0.50	1402	3.42	1.71	0.50	1441
23	22	4.03	1.53	0.38	1389	3.77	1.43	0.38	1467	3.64	1.38	0.38	1493
24	18	3.63	2.39	0.66	1284	3.33	2.20	0.66	1362	3.20	2.11	0.66	1389
24	20	3.81	2.06	0.54	1336	3.55	1.92	0.54	1402	3.42	1.85	0.54	1441
24	22	4.03	1.69	0.42	1389	3.77	1.59	0.42	1467	3.64	1.53	0.42	1493
24	24	4.26	1.28	0.30	1441	4.00	1.20	0.30	1507	3.89	1.17	0.30	1539
25	18	3.63	2.54	0.70	1284	3.33	2.33	0.70	1362	3.20	2.24	0.70	1389
25	20	3.81	2.21	0.58	1336	3.55	2.06	0.58	1402	3.42	1.99	0.58	1441
25	22	4.03	1.86	0.46	1389	3.77	1.74	0.46	1467	3.64	1.68	0.46	1493
25	24	4.26	1.45	0.34	1441	4.00	1.36	0.34	1507	3.89	1.32	0.34	1539
26	18	3.63	2.68	0.74	1284	3.33	2.46	0.74	1362	3.20	2.37	0.74	1389
26	20	3.81	2.36	0.62	1336	3.55	2.20	0.62	1402	3.42	2.12	0.62	1441
26	22	4.03	2.02	0.50	1389	3.77	1.89	0.50	1467	3.64	1.82	0.50	1493
26	24	4.26	1.62	0.38	1441	4.00	1.52	0.38	1507	3.89	1.48	0.38	1539
26	26	4.48	1.16	0.26	1493	4.22	1.10	0.26	1559	4.09	1.06	0.26	1592
27	18	3.63	2.83	0.78	1284	3.33	2.60	0.78	1362	3.20	2.50	0.78	1389
27	20	3.81	2.52	0.66	1336	3.55	2.34	0.66	1402	3.42	2.26	0.66	1441
27	22	4.03	2.18	0.54	1389	3.77	2.04	0.54	1467	3.64	1.97	0.54	1493
27	24	4.26	1.79	0.42	1441	4.00	1.68	0.42	1507	3.89	1.63	0.42	1539
27	26	4.48	1.34	0.30	1493	4.22	1.27	0.30	1559	4.09	1.23	0.30	1592
28	18	3.63	2.97	0.82	1284	3.33	2.73	0.82	1362	3.20	2.62	0.82	1389
28	20	3.81	2.67	0.70	1336	3.55	2.49	0.70	1402	3.42	2.40	0.70	1441
28	22	4.03	2.34	0.58	1389	3.77	2.19	0.58	1467	3.64	2.11	0.58	1493
28	24	4.26	1.96	0.46	1441	4.00	1.84	0.46	1507	3.89	1.79	0.46	1539
28	26	4.48	1.52	0.34	1493	4.22	1.43	0.34	1559	4.09	1.39	0.34	1592
29	18	3.63	3.12	0.86	1284	3.33	2.86	0.86	1362	3.20	2.75	0.86	1389
29	20	3.81	2.82	0.74	1336	3.55	2.63	0.74	1402	3.42	2.53	0.74	1441
29	22	4.03	2.50	0.62	1389	3.77	2.34	0.62	1467	3.64	2.26	0.62	1493
29	24	4.26	2.13	0.50	1441	4.00	2.00	0.50	1507	3.89	1.94	0.50	1539
29	26	4.48	1.70	0.38	1493	4.22	1.60	0.38	1559	4.09	1.55	0.38	1592
30	18	3.63	3.26	0.90	1284	3.33	3.00	0.90	1362	3.20	2.88	0.90	1389
30	20	3.81	2.97	0.78	1336	3.55	2.77	0.78	1402	3.42	2.67	0.78	1441
30	22	4.03	2.66	0.66	1389	3.77	2.49	0.66	1467	3.64	2.41	0.66	1493
30	24	4.26	2.30	0.54	1441	4.00	2.16	0.54	1507	3.89	2.10	0.54	1539
30	26	4.48	1.88	0.42	1493	4.22	1.77	0.42	1559	4.09	1.72	0.42	1592
31	18	3.63	3.41	0.94	1284	3.33	3.13	0.94	1362	3.20	3.01	0.94	1389
31	20	3.81	3.13	0.82	1336	3.55	2.91	0.82	1402	3.42	2.81	0.82	1441
31	22	4.03	2.82	0.70	1389	3.77	2.64	0.70	1467	3.64	2.55	0.70	1493
31	24	4.26	2.47	0.58	1441	4.00	2.32	0.58	1507	3.89	2.25	0.58	1539
31	26	4.48	2.06	0.46	1493	4.22	1.94	0.46	1559	4.09	1.88	0.46	1592
32	18	3.63	3.55	0.98	1284	3.33	3.26	0.98	1362	3.20	3.14	0.98	1389
32	20	3.81	3.28	0.86	1336	3.55	3.05	0.86	1402	3.42	2.94	0.86	1441
32	22	4.03	2.98	0.74	1389	3.77	2.79	0.74	1467	3.64	2.70	0.74	1493
32	24	4.26	2.64	0.62	1441	4.00	2.48	0.62	1507	3.89	2.41	0.62	1539
32	26	4.48	2.24	0.50	1493	4.22	2.11	0.50	1559	4.09	2.04	0.50	1592

NOTE Q : Total capacity (kW) SHF : Sensible heat factor
SHC : Sensible heat capacity (kW) INPUT : Total power input (W)

PERFORMANCE DATA
COOL operation(240V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 3.7 kW INPUT : 1400 W SHF : 0.72

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.35	2.35	0.54	1120	4.16	2.25	0.54	1176	4.00	2.16	0.54	1232	3.85	2.08	0.54	1288
21	20	4.53	1.90	0.42	1176	4.35	1.83	0.42	1246	4.22	1.77	0.42	1274	4.07	1.71	0.42	1330
22	18	4.35	2.52	0.58	1120	4.16	2.41	0.58	1176	4.00	2.32	0.58	1232	3.85	2.23	0.58	1288
22	20	4.53	2.08	0.46	1176	4.35	2.00	0.46	1246	4.22	1.94	0.46	1274	4.07	1.87	0.46	1330
22	22	4.72	1.60	0.34	1218	4.55	1.55	0.34	1295	4.44	1.51	0.34	1330	4.26	1.45	0.34	1386
23	18	4.35	2.70	0.62	1120	4.16	2.58	0.62	1176	4.00	2.48	0.62	1232	3.85	2.39	0.62	1288
23	20	4.53	2.27	0.50	1176	4.35	2.17	0.50	1246	4.22	2.11	0.50	1274	4.07	2.04	0.50	1330
23	22	4.72	1.79	0.38	1218	4.55	1.73	0.38	1295	4.44	1.69	0.38	1330	4.26	1.62	0.38	1386
24	18	4.35	2.87	0.66	1120	4.16	2.75	0.66	1176	4.00	2.64	0.66	1232	3.85	2.54	0.66	1288
24	20	4.53	2.45	0.54	1176	4.35	2.35	0.54	1246	4.22	2.28	0.54	1274	4.07	2.20	0.54	1330
24	22	4.72	1.98	0.42	1218	4.55	1.91	0.42	1295	4.44	1.86	0.42	1330	4.26	1.79	0.42	1386
24	24	4.96	1.49	0.30	1274	4.77	1.43	0.30	1344	4.66	1.40	0.30	1386	4.51	1.35	0.30	1456
25	18	4.35	3.04	0.70	1120	4.16	2.91	0.70	1176	4.00	2.80	0.70	1232	3.85	2.69	0.70	1288
25	20	4.53	2.63	0.58	1176	4.35	2.52	0.58	1246	4.22	2.45	0.58	1274	4.07	2.36	0.58	1330
25	22	4.72	2.17	0.46	1218	4.55	2.09	0.46	1295	4.44	2.04	0.46	1330	4.26	1.96	0.46	1386
25	24	4.96	1.69	0.34	1274	4.77	1.62	0.34	1344	4.66	1.59	0.34	1386	4.51	1.53	0.34	1456
26	18	4.35	3.22	0.74	1120	4.16	3.08	0.74	1176	4.00	2.96	0.74	1232	3.85	2.85	0.74	1288
26	20	4.53	2.81	0.62	1176	4.35	2.70	0.62	1246	4.22	2.62	0.62	1274	4.07	2.52	0.62	1330
26	22	4.72	2.36	0.50	1218	4.55	2.28	0.50	1295	4.44	2.22	0.50	1330	4.26	2.13	0.50	1386
26	24	4.96	1.88	0.38	1274	4.77	1.81	0.38	1344	4.66	1.77	0.38	1386	4.51	1.72	0.38	1456
26	26	5.11	1.33	0.26	1344	4.96	1.29	0.26	1414	4.88	1.27	0.26	1456	4.74	1.23	0.26	1498
27	18	4.35	3.39	0.78	1120	4.16	3.25	0.78	1176	4.00	3.12	0.78	1232	3.85	3.00	0.78	1288
27	20	4.53	2.99	0.66	1176	4.35	2.87	0.66	1246	4.22	2.78	0.66	1274	4.07	2.69	0.66	1330
27	22	4.72	2.55	0.54	1218	4.55	2.46	0.54	1295	4.44	2.40	0.54	1330	4.26	2.30	0.54	1386
27	24	4.96	2.08	0.42	1274	4.77	2.00	0.42	1344	4.66	1.96	0.42	1386	4.51	1.90	0.42	1456
27	26	5.11	1.53	0.30	1344	4.96	1.49	0.30	1414	4.88	1.47	0.30	1456	4.74	1.42	0.30	1498
28	18	4.35	3.56	0.82	1120	4.16	3.41	0.82	1176	4.00	3.28	0.82	1232	3.85	3.16	0.82	1288
28	20	4.53	3.17	0.70	1176	4.35	3.04	0.70	1246	4.22	2.95	0.70	1274	4.07	2.85	0.70	1330
28	22	4.72	2.74	0.58	1218	4.55	2.64	0.58	1295	4.44	2.58	0.58	1330	4.26	2.47	0.58	1386
28	24	4.96	2.28	0.46	1274	4.77	2.20	0.46	1344	4.66	2.14	0.46	1386	4.51	2.08	0.46	1456
28	26	5.11	1.74	0.34	1344	4.96	1.69	0.34	1414	4.88	1.66	0.34	1456	4.74	1.61	0.34	1498
29	18	4.35	3.74	0.86	1120	4.16	3.58	0.86	1176	4.00	3.44	0.86	1232	3.85	3.31	0.86	1288
29	20	4.53	3.35	0.74	1176	4.35	3.22	0.74	1246	4.22	3.12	0.74	1274	4.07	3.01	0.74	1330
29	22	4.72	2.92	0.62	1218	4.55	2.82	0.62	1295	4.44	2.75	0.62	1330	4.26	2.64	0.62	1386
29	24	4.96	2.48	0.50	1274	4.77	2.39	0.50	1344	4.66	2.33	0.50	1386	4.51	2.26	0.50	1456
29	26	5.11	1.94	0.38	1344	4.96	1.88	0.38	1414	4.88	1.86	0.38	1456	4.74	1.80	0.38	1498
30	18	4.35	3.91	0.90	1120	4.16	3.75	0.90	1176	4.00	3.60	0.90	1232	3.85	3.46	0.90	1288
30	20	4.53	3.54	0.78	1176	4.35	3.39	0.78	1246	4.22	3.29	0.78	1274	4.07	3.17	0.78	1330
30	22	4.72	3.11	0.66	1218	4.55	3.00	0.66	1295	4.44	2.93	0.66	1330	4.26	2.81	0.66	1386
30	24	4.96	2.68	0.54	1274	4.77	2.58	0.54	1344	4.66	2.52	0.54	1386	4.51	2.44	0.54	1456
30	26	5.11	2.14	0.42	1344	4.96	2.08	0.42	1414	4.88	2.05	0.42	1456	4.74	1.99	0.42	1498
31	18	4.35	4.09	0.94	1120	4.16	3.91	0.94	1176	4.00	3.76	0.94	1232	3.85	3.62	0.94	1288
31	20	4.53	3.72	0.82	1176	4.35	3.56	0.82	1246	4.22	3.46	0.82	1274	4.07	3.34	0.82	1330
31	22	4.72	3.30	0.70	1218	4.55	3.19	0.70	1295	4.44	3.11	0.70	1330	4.26	2.98	0.70	1386
31	24	4.96	2.88	0.58	1274	4.77	2.77	0.58	1344	4.66	2.70	0.58	1386	4.51	2.62	0.58	1456
31	26	5.11	2.35	0.46	1344	4.96	2.28	0.46	1414	4.88	2.25	0.46	1456	4.74	2.18	0.46	1498
32	18	4.35	4.26	0.98	1120	4.16	4.08	0.98	1176	4.00	3.92	0.98	1232	3.85	3.77	0.98	1288
32	20	4.53	3.90	0.86	1176	4.35	3.74	0.86	1246	4.22	3.63	0.86	1274	4.07	3.50	0.86	1330
32	22	4.72	3.49	0.74	1218	4.55	3.37	0.74	1295	4.44	3.29	0.74	1330	4.26	3.15	0.74	1386
32	24	4.96	3.07	0.62	1274	4.77	2.96	0.62	1344	4.66	2.89	0.62	1386	4.51	2.80	0.62	1456
32	26	5.11	2.55	0.50	1344	4.96	2.48	0.50	1414	4.88	2.44	0.50	1456	4.74	2.37	0.50	1498

NOTE Q : Total capacity (kW) SHF : Sensible heat factor
SHC : Sensible heat capacity (kW) INPUT : Total power input (W)

PERFORMANCE DATA
COOL operation(240V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 3.7 kW INPUT : 1400 W SHF : 0.72

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	OUT	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.63	1.96	0.54	1372	3.33	1.80	0.54	1456	3.20	1.73	0.54	1484
21	20	3.81	1.60	0.42	1428	3.55	1.49	0.42	1498	3.42	1.44	0.42	1540
22	18	3.63	2.10	0.58	1372	3.33	1.93	0.58	1456	3.20	1.86	0.58	1484
22	20	3.81	1.75	0.46	1428	3.55	1.63	0.46	1498	3.42	1.57	0.46	1540
22	22	4.03	1.37	0.34	1484	3.77	1.28	0.34	1568	3.64	1.24	0.34	1596
23	18	3.63	2.25	0.62	1372	3.33	2.06	0.62	1456	3.20	1.98	0.62	1484
23	20	3.81	1.91	0.50	1428	3.55	1.78	0.50	1498	3.42	1.71	0.50	1540
23	22	4.03	1.53	0.38	1484	3.77	1.43	0.38	1568	3.64	1.38	0.38	1596
24	18	3.63	2.39	0.66	1372	3.33	2.20	0.66	1456	3.20	2.11	0.66	1484
24	20	3.81	2.06	0.54	1428	3.55	1.92	0.54	1498	3.42	1.85	0.54	1540
24	22	4.03	1.69	0.42	1484	3.77	1.59	0.42	1568	3.64	1.53	0.42	1596
24	24	4.26	1.28	0.30	1540	4.00	1.20	0.30	1610	3.89	1.17	0.30	1645
25	18	3.63	2.54	0.70	1372	3.33	2.33	0.70	1456	3.20	2.24	0.70	1484
25	20	3.81	2.21	0.58	1428	3.55	2.06	0.58	1498	3.42	1.99	0.58	1540
25	22	4.03	1.86	0.46	1484	3.77	1.74	0.46	1568	3.64	1.68	0.46	1596
25	24	4.26	1.45	0.34	1540	4.00	1.36	0.34	1610	3.89	1.32	0.34	1645
26	18	3.63	2.68	0.74	1372	3.33	2.46	0.74	1456	3.20	2.37	0.74	1484
26	20	3.81	2.36	0.62	1428	3.55	2.20	0.62	1498	3.42	2.12	0.62	1540
26	22	4.03	2.02	0.50	1484	3.77	1.89	0.50	1568	3.64	1.82	0.50	1596
26	24	4.26	1.62	0.38	1540	4.00	1.52	0.38	1610	3.89	1.48	0.38	1645
26	26	4.48	1.16	0.26	1596	4.22	1.10	0.26	1666	4.09	1.06	0.26	1701
27	18	3.63	2.83	0.78	1372	3.33	2.60	0.78	1456	3.20	2.50	0.78	1484
27	20	3.81	2.52	0.66	1428	3.55	2.34	0.66	1498	3.42	2.26	0.66	1540
27	22	4.03	2.18	0.54	1484	3.77	2.04	0.54	1568	3.64	1.97	0.54	1596
27	24	4.26	1.79	0.42	1540	4.00	1.68	0.42	1610	3.89	1.63	0.42	1645
27	26	4.48	1.34	0.30	1596	4.22	1.27	0.30	1666	4.09	1.23	0.30	1701
28	18	3.63	2.97	0.82	1372	3.33	2.73	0.82	1456	3.20	2.62	0.82	1484
28	20	3.81	2.67	0.70	1428	3.55	2.49	0.70	1498	3.42	2.40	0.70	1540
28	22	4.03	2.34	0.58	1484	3.77	2.19	0.58	1568	3.64	2.11	0.58	1596
28	24	4.26	1.96	0.46	1540	4.00	1.84	0.46	1610	3.89	1.79	0.46	1645
28	26	4.48	1.52	0.34	1596	4.22	1.43	0.34	1666	4.09	1.39	0.34	1701
29	18	3.63	3.12	0.86	1372	3.33	2.86	0.86	1456	3.20	2.75	0.86	1484
29	20	3.81	2.82	0.74	1428	3.55	2.63	0.74	1498	3.42	2.53	0.74	1540
29	22	4.03	2.50	0.62	1484	3.77	2.34	0.62	1568	3.64	2.26	0.62	1596
29	24	4.26	2.13	0.50	1540	4.00	2.00	0.50	1610	3.89	1.94	0.50	1645
29	26	4.48	1.70	0.38	1596	4.22	1.60	0.38	1666	4.09	1.55	0.38	1701
30	18	3.63	3.26	0.90	1372	3.33	3.00	0.90	1456	3.20	2.88	0.90	1484
30	20	3.81	2.97	0.78	1428	3.55	2.77	0.78	1498	3.42	2.67	0.78	1540
30	22	4.03	2.66	0.66	1484	3.77	2.49	0.66	1568	3.64	2.41	0.66	1596
30	24	4.26	2.30	0.54	1540	4.00	2.16	0.54	1610	3.89	2.10	0.54	1645
30	26	4.48	1.88	0.42	1596	4.22	1.77	0.42	1666	4.09	1.72	0.42	1701
31	18	3.63	3.41	0.94	1372	3.33	3.13	0.94	1456	3.20	3.01	0.94	1484
31	20	3.81	3.13	0.82	1428	3.55	2.91	0.82	1498	3.42	2.81	0.82	1540
31	22	4.03	2.82	0.70	1484	3.77	2.64	0.70	1568	3.64	2.55	0.70	1596
31	24	4.26	2.47	0.58	1540	4.00	2.32	0.58	1610	3.89	2.25	0.58	1645
31	26	4.48	2.06	0.46	1596	4.22	1.94	0.46	1666	4.09	1.88	0.46	1701
32	18	3.63	3.55	0.98	1372	3.33	3.26	0.98	1456	3.20	3.14	0.98	1484
32	20	3.81	3.28	0.86	1428	3.55	3.05	0.86	1498	3.42	2.94	0.86	1540
32	22	4.03	2.98	0.74	1484	3.77	2.79	0.74	1568	3.64	2.70	0.74	1596
32	24	4.26	2.64	0.62	1540	4.00	2.48	0.62	1610	3.89	2.41	0.62	1645
32	26	4.48	2.24	0.50	1596	4.22	2.11	0.50	1666	4.09	2.04	0.50	1701

NOTE Q : Total capacity (kW) SHF : Sensible heat factor
SHC : Sensible heat capacity (kW) INPUT : Total power input (W)

PERFORMANCE DATA
HEAT operation(220V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 4.0 kW INPUT : 1130W

	OUTDOOR DB(℃)													
INDOOR	-10		-5		0		5		10		15		20	
DB(℃)	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.52	735	3.04	881	3.56	994	4.08	1074	4.60	1141	5.08	1175	5.60	1198
21	2.40	791	2.88	938	3.40	1040	3.88	1119	4.40	1175	4.88	1209	5.38	1254
26	2.16	848	2.68	994	3.16	1096	3.68	1175	4.20	1232	4.68	1266	5.20	1300

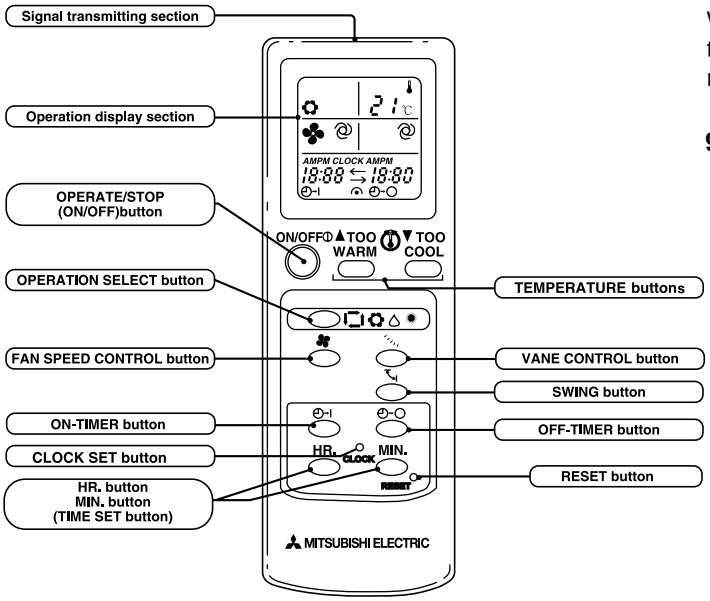
PERFORMANCE DATA
HEAT operation(240V)
MCFH-13NV -E3 : MUCFH-13NV -E3

CAPACITY : 4.0 kW INPUT : 1220W

	OUTDOOR DB(℃)													
INDOOR	-10		-5		0		5		10		15		20	
DB(℃)	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.52	793	3.04	952	3.56	1074	4.08	1159	4.60	1232	5.08	1269	5.60	1293
21	2.40	854	2.88	1013	3.40	1122	3.88	1208	4.40	1269	4.88	1305	5.38	1354
26	2.16	915	2.68	1074	3.16	1183	3.68	1269	4.20	1330	4.68	1366	5.20	1403

9 MICROPROCESSOR CONTROL

WIRELESS REMOTE CONTROLLER



INDOOR UNIT DISPLAY SECTION

OPERATION INDICATOR lamp

The operation indicator at the right side of the indoor unit indicates the operation state.

Operation Indicator

lighting

not lighting

Indication	Operation state	Difference between set temperatuer and room temperature
☀ ☀	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 2 ℃ or more
☀ ○	This shows that the room temperature is approaching the target temperature.	Approx. 2 ℃ or less

MCFH-13NV - E3

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.
Indoor unit receives the signal with a beep tone.
When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

9-1. "I FEEL CONTROL" (▭) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select "I FEEL CONTROL" **(▭)** mode with the OPERATION SELECT button.
(3) The operation mode is determined by the room temperature at start-up of the operation.

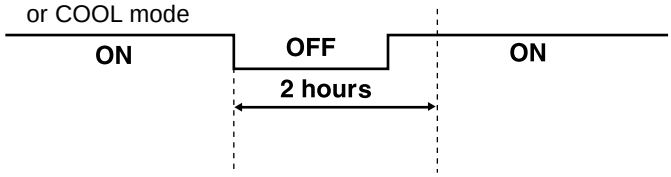
Initial room temperature	Mode
25℃ or more	COOL mode of "I FEEL CONTROL"
23℃ to 25℃	DRY mode of "I FEEL CONTROL"
less than 23℃	HEAT mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (◴→|) operation, mode is determined according to the room temperature at set time the operation starts.
- When the system is stopped with the OPERATE/ STOP(ON/OFF) button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" **(▭)** mode, the system operates in previous mode automatically regardless of the room temperature.

Example

Previous operation
COOL mode of
"I FEEL CONTROL"
or COOL mode

Restart
COOL mode of
"I FEEL CONTROL"

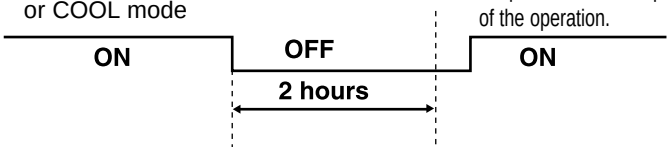


When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Example

Previous operation
COOL mode of
"I FEEL CONTROL"
or COOL mode

Restart
COOL or DRY or HEAT mode of "I FEEL CONTROL" that is determined by room temperature at start-up of the operation.



(4) The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	✵1
	25℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperature minus 2℃	
HEAT mode of "I FEEL CONTROL"	less than 23℃	26℃	

✵1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURE buttons
In “I FEEL CONTROL” mode, set temperature is decided by the microprocessor based on the room temperature.
In addition, set temperature can be controlled by or TOO WARM or TOO COOL buttons when you feel too warm or too cool. Each time the TOO WARM or TOO COOL button is pressed, the indoor unit receives the signal and emits a beep tone.

● **Fuzzy control**

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button, and the user’s preference to heat or cool. So this is called “Fuzzy control”, and works only in “I FEEL CONTROL” mode.
In DRY mode of “I FEEL CONTROL”, the set temperature doesn’t change.

▲TOO
COOL ⋯ To raise the set temperature 1~2 degrees(°C)

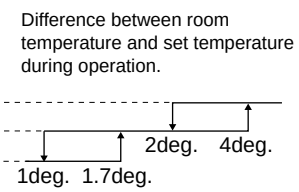
▼ TOO
WARM ⋯ To lower the set temperature 1~2 degrees(°C)

— COOL mode of “I FEEL CONTROL” —

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.
In AUTO the fan speed is as follows.

Initial temperature difference	Fan Speed
Room temperature minus set temperature : 2 degrees or more	Hi
Room temperature minus set temperature : Between 1 and 2 degrees	Me
Room temperature minus set temperature : less than 1 degree	Lo



2. Coil frost prevention

① Temperature control
When the indoor coil thermistor RT12 reads -1°C or below, the coil frost prevention mode starts immediately.
However, the coil frost prevention doesn’t work for 5 minutes since the compressor has started.
The indoor fan operates at the set speed and the compressor stops for 5 minutes.
After that, if RT12 still reads below -1°C, this mode prolonged until the RT12 reads over -1°C.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

a. Compressor has been continuously operating.

b. Indoor fan speed is Lo or Me.

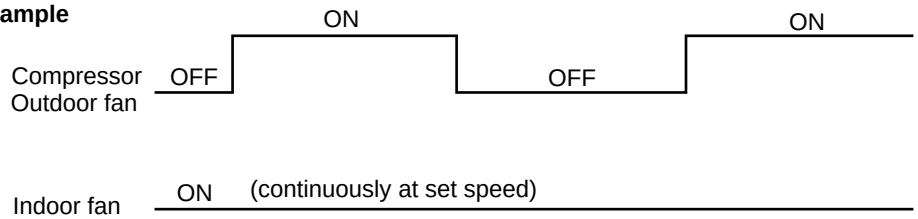
c. Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26°C. However, when two of the above conditions (b. and c.) are satisfied again, Time accumulation is resumed.

Operation chart

Example



—DRY mode of "I FEEL CONTROL"—

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the room temperature.

By such controls, indoor air flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

However, in AUTO fan operation, fan speed becomes Lo.

2. The operation of the compressor and indoor/ outdoor fan

Compressor operates by temperature control and time control.

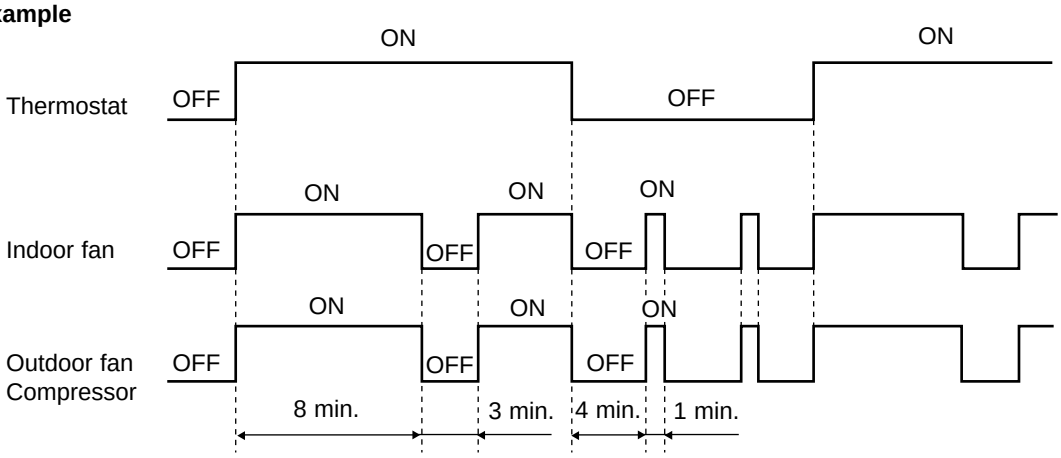
Set temperature is controlled to fall 2°C from initial room temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

- When the room temperature is 23°C or over:
  When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.
  When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.
- When the room temperature is under 23°C.
  When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.
  When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart

Example



3. Coil frost prevention

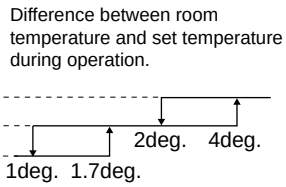
- The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".
- Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection (Coil frost prevention) has the priority.
  However, when coil frost prevention works while the compressor is not operating, it's speed becomes Lo.

— HEAT mode of “I FEEL CONTROL” —

1. Indoor fan speed control

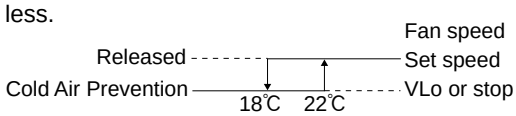
(1) In AUTO the fan speed is as follows.

Initial temperature difference	Fan speed
Set temperature minus room temperature: 2 degrees or more	Hi
Set temperature minus room temperature: Between 1 and 2 degrees	Me
Set temperature minus room temperature: less than 1 degree	Lo



(2) Cold air prevention control

The fan runs at set speed when the indoor coil thermistor RT12 temperature exceeds 22°C. The fan operates at VLo when the temperature of indoor coil thermistor RT12 is below 18°C. But the fan stops when the indoor fan operates at VLo and the room temperature is 15°C or less.



NOTE : If the temperature of RT12 reads from 18°C to 22°C at the air conditioner starting and also after defrosting, this control works.

(3) Warm air control

When compressor starts in heating operation or after defrosting, the fan changes the speed due to the indoor coil thermistor RT12 temperature to blow out warm air.

After releasing of cold air prevention, when the indoor coil temperature is 37°C or above, the fan speed shifts to the set speed, and when the fan speed is changed by the remote controller, the fan speed is the set speed.

When the indoor coil temperature is less than 37°C, the fan speed is controlled by time as below.

<Time condition>	<Indoor fan speed>
less than 2 minutes	Lo
2 minutes to 4 minutes	Me
4 minutes or more	Hi

The upper limit of the fan speed is the set speed.

If the thermostat turns off, this operation changes to flow soft control.

(4) Flow soft control

After the thermostat turns off, the indoor fan operates at VLo.

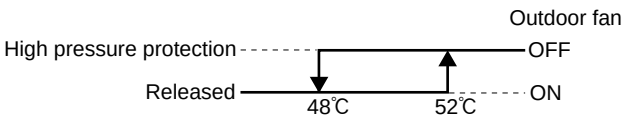
NOTE : When the thermostat turns on, the fan operates at the set speed. Due to the cold air prevention control, the fan does not start at set speed until the indoor coil thermistor RT12 reads 22°C or more.

2. High pressure protection

During heating operation, the outdoor fan motor is controlled by the temperature of indoor coil thermistor RT12 temperature for excess rise protection of compressor discharge pressure.

Outdoor fan OFF : 52°C

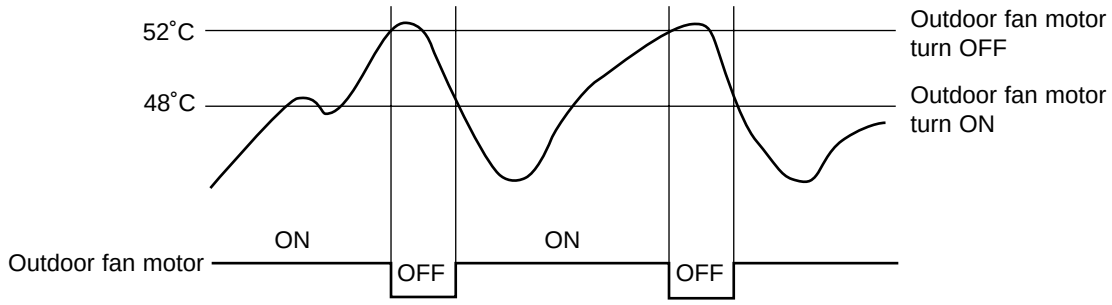
Outdoor fan ON : 48°C



High pressure protection chart

Example

Indoor coil thermistor RT12 temperature



NOTE1 : When the outdoor fan is OFF in heating, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

NOTE2 : When connected to MXZ-32RV- E1 outdoor unit, the indoor unit sends the data for the temperature to the outdoor unit according to the indoor coil temperature.
For the further information, refer to the service manual OB227 REVISED EDITION-B.

3. Defrosting

Defrosting of outdoor heat exchanger is controlled by DEICER P.C. board, with detection by the defrost thermistor RT61.

(1) Starting conditions of defrost

When all conditions of a) ~ c) are satisfied, the defrosting operation starts.

a) The compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.

b) The defrost thermistor RT61 reads - 3°C or less.

c) After releasing the high pressure protection 4 minutes and 15 seconds have elapsed.

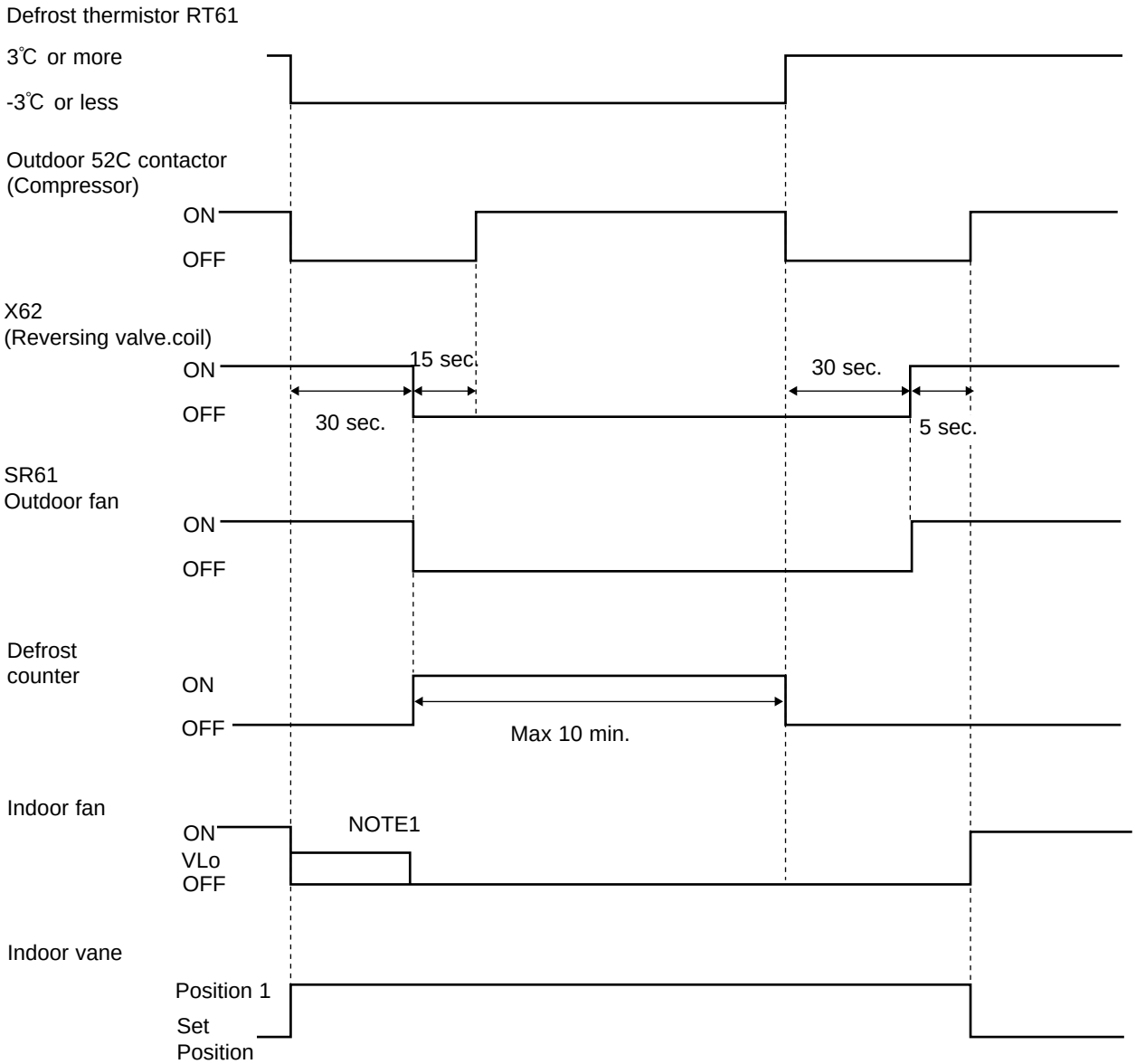
(2) Releasing conditions of defrost

When the condition d) or e) is satisfied, the defrosting operation stops.

d) The defrost thermistor RT61 reads 3°C or more.

e) The defrosting time exceeds 10 minutes.

(3) Defrosting time chart



NOTE1 : When the indoor coil thermistor reads above 18°C, indoor fan operates at VLo for 30 seconds.
When the indoor coil thermistor reads 18°C or less, the indoor fan stops.

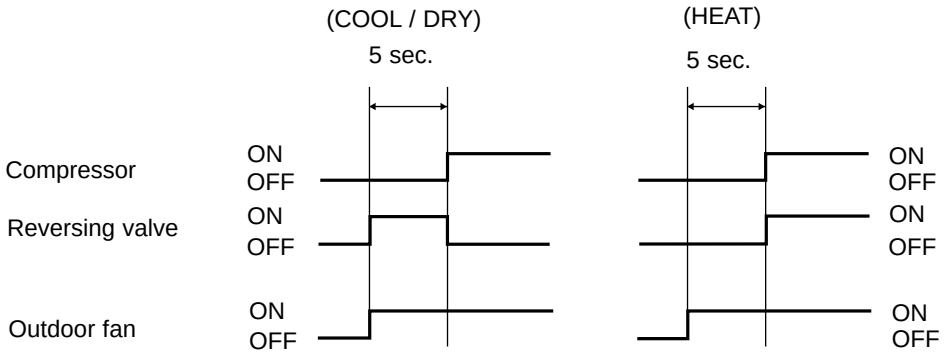
NOTE2 : Refer to the Service Manual OB227 REVISED EDITION-B when MCFH-13NV-E3 is connected with MXZ-32RV-E1 as multi system units.

4. Reversing valve control

Heating · · · · · ON
Cooling · · · · · OFF
Dry · · · · · · · · OFF

NOTE1 : The reversing valve reverses for 5 seconds right before start-up of the compressor.

NOTE2 : Refer to the Service Manual OB227 REVISED EDITION-B when MCFH-13NV-E3 is connected with MXZ-32RV-E1 as multi system units.



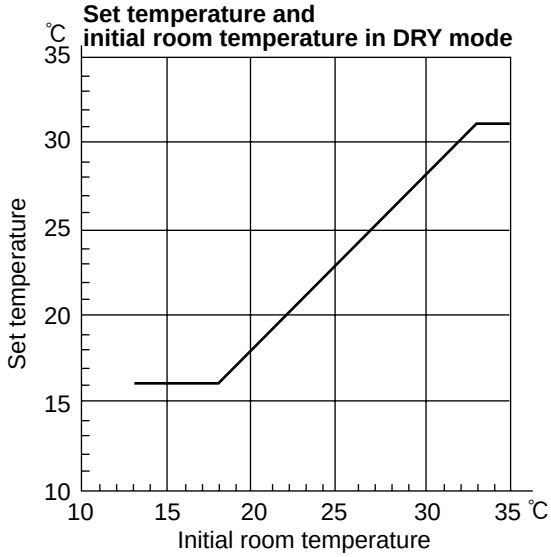
9-2. COOL (✿) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select COOL mode with the OPERATION SELECT button.
(3) Press the TEMPERATURE buttons
(TOO WARM or TOO COOL button)
to select the desired temperature.
The setting range is 16 ~ 31°C
※ Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.
※ Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

9-3. DRY (△) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select DRY mode with the OPERATION SELECT button.
(3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) does not work.
The other operations are as same as DRY mode of "I FEEL CONTROL".

Set temperature and initial room temperature in DRY mode



(4) DRY operation will not function when the room temperature is 13°C or below.
(5) When DRY operation functions, the fan speed is lower than cool operation.

9-4. HEAT (☼) OPERATION

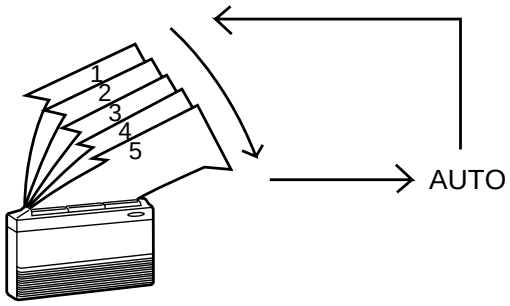
(1) Press OPERATE/STOP(ON/OFF) button.
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select HEAT mode with the OPERATION SELECT button.
(3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
(4) Indoor fan speed control, high pressure protection, defrosting, reversing valve control are the same as HEAT mode of "I FEEL CONTROL".

9-5. AUTO VANE OPERATION

(1) Vane motor drive

This model is equipped with a stepping motor for the vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

(2) Each time the VANE CONTROL button is pressed, angle of horizontal vane is changed in sequence, from 1, 2, 3, 4, 5 to AUTO.



(3) Positioning

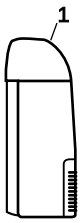
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

(a) When the OPERATE/STOP(ON/OFF) button is pressed.
(b) When the vane control is changed from AUTO to MANUAL.
(c) When the SWING is finished.
(d) When the test run starts.
(e) When the power supply turns ON.

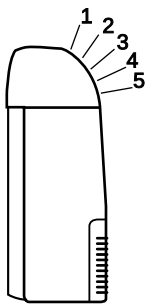
(4) VANE AUTO mode

In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

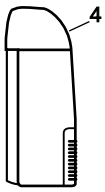
1. In COOL and DRY operation



Vane angle is fixed to position 1.



2. In HEAT operation



Vane angle is fixed to position 4.

(5) STOP (operation OFF) and ON-TIMER standby.

When the following cases occur, the vane returns to the closed position.

(a) When the OPERATE/STOP (ON/OFF) button is pressed (POWER OFF).
(b) When the operation is stopped by the emergency operation.
(c) When the ON-TIMER is on standby.

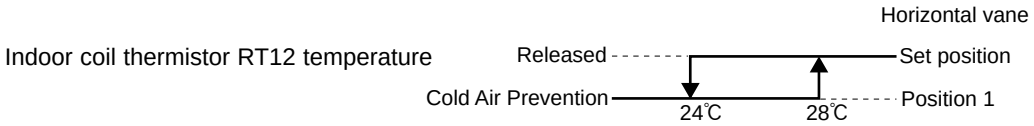
(6) Dew prevention

During COOL or DRY operation at position 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the angle of horizontal vane automatically changes to Position 1 for dew prevention.

(7) SWING ( ) MODE

By pressing the SWING ( ) button, horizontal vane swings vertically between Position 1 and 5 in COOL and DRY operation, between Position 2 and 4 in HEAT operation. The remote controller displays " ". If the VANE CONTROL ( ) button or SWING ( ) button is pressed during SWING mode or the operation stops or changes to other mode, SWING mode is released.

(8) Cold air prevention in HEAT operation.
When any of the following conditions occurs in HEAT operation, the angle of horizontal vane automatically changes to Position 1 to prevent cold air blowing on users.
① Compressor is not operating.
② Defrosting is performed.
③ Indoor coil thermistor RT12 reads 24℃ or below.
④ Indoor coil thermistor RT12 temperature is raising from 24℃ or below, but it does not exceed 28℃.



NOTE : If the temperature of RT12 reads from 24℃ to 28℃ at the air conditioner starting, this control works.

9-6. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.
(2) Check that the current time is set correctly.
NOTE : Timer operation will not work without setting the current time. Initially “AM0:00” blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.
(3) Press ON-TIMER, OFF-TIMER button to select the operation.
“ ◴→| ” button ... AUTO START operation (ON timer)
“ ◴→◯ ” button ... AUTO STOP operation (OFF timer)
(4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.
HR. and MIN. button will work when “ ◴→| ” or “ ◴→◯ ” button is flashing.
These marks disappear in 1 minute.
After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.
NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.
NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.
● A power failure occurs.
● The circuit breaker functions.

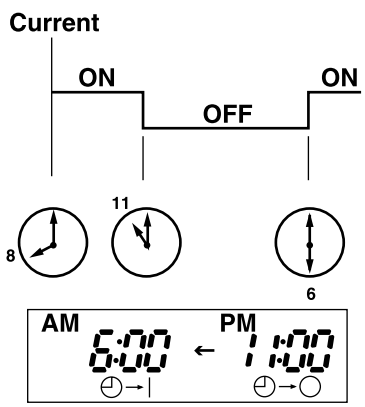
2. Cancel

TIMER setting can be cancelled with the TIMER CONTROL buttons. (“ ◴→| ” or “ ◴→◯ ”)
To cancel the ON timer, press the “ ◴→| ” button.
To cancel the OFF timer, press the “ ◴→◯ ” button.
TIMER is cancelled and the display of set time disappears.

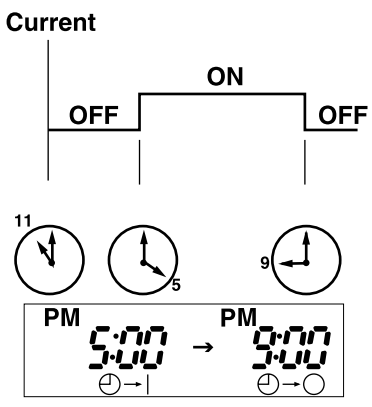
PROGRAM TIMER

●The OFF timer and ON timer can be used in combination.
● “→” and “← ” display show the order of the OFF timer and ON timer operation.

(Example 1) The current timer is 8:00 PM.
The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.
The unit turns on at 5:00 PM, and off at 9:00 PM.

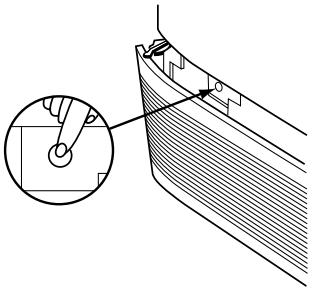


9-7. EMERGENCY-TEST OPERATION

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the OPERATION INDICATOR lamp will light.
The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan runs at high notch and the system is in continuous operation. (The thermostat is ON)
After 30 minutes of test run operation the system shifts to EMERGENCY COOL or HEAT MODE with a set temperature of 24˚C. The fan shifts to Me notch.
This operation continues until the EMERGENCY OPERATION switch is pressed again or the unit receives any signal from the remote controller. In case of latter normal operation will start.
The coil frost prevention works even in this operation, and defrosting too.
In the test run or emergency operation, the horizontal vane operates in AUTO mode.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.

EMERGENCY
OPERATION switch



OPERATION INDICATOR lamp

Press once <Cool>

Press again <Heat>

Press once again <Stop>

9-8. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the the auto restart P.C. board.

The “AUTO RESTART FUNCTION” sets to work the moment the power has restored after power failure. Then, the unit will restart automatically. However if the unit is operated in “I FEEL CONTROL” mode before power failure, the operation is not memorized. In “I FEEL CONTROL mode”, the operation is decided by the initial room temperature.

NOTE :

- The operation settings are memorized when 10 seconds have passed after the remote controller was operated.
- If the main power is turned off or a power failure occurs while AUTO START/ STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart.
  Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

10 SERVICE FUNCTIONS

MCFH-13NV - E3

10-1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JP607 and R853 on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction. See Page 34.
Defrost thermistor RT61 must read below -3℃.

10-2. CHANGE IN DEFROST SETTING

<JPC> when the JPC wire of the deicer P.C. board is cut, the defrost interval time will be changed. (See page 34.)
<JPE> when the JPE wire of the deicer P.C. board is cut, the defrost temperature will be changed. (See page 34.)

Jumper wire	Change point
JPC	Defrost interval time changes from 40 minutes to 15 minutes
JPE	Deforst start temperature changes from -3℃ to 0℃ Deforst finish temperature changes from 3℃ to 10℃.

10-3. TIMER SHORT MODE

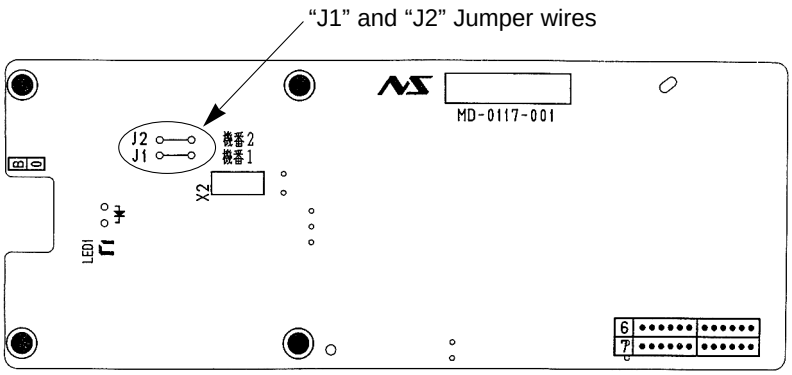
For service, set time can be shortened by short circuit of JPG and JPS on the electronic control P.C. board.
The time will be shortened as follows.
3-minutes time delay : 3-minutes → 3-seconds
AUTO START : 1 hour → 1-minute
AUTO STOP : 1 hour → 1-minute
} Short the connector during the timer mode.

10-4. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

A maximum of 4 indoor units with wireless remote controllers can be used in a room. In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

How to modify the remote controller P.C. board

Remove batteries before modification.
The board has a print as shown below;



NOTE : For remodelling, take out the batteries at first.
After finish remodelling, put back the batteries then push the RESET button.

The P.C. board has the print "J1" and "J2". Jumper wires are mounted to each "J1" and "J2". Cut J1 and J2 according to the number of indoor unit as shown in Table 1.
After modification, push the RESET button.

Table1.

	1 unit operation	2 units operation	3 units operation	4 units operation
No.1 unit	No modification	Same as at left	Same as at left	Same as at left
No.2 unit	————	Cut J1	Same as at left	Same as at left
No.3 unit	————	————	Cut J2	Same as at left
No.4 unit	————	————	————	Cut both J1 and J2

NOTE : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting-error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

10-5. RELEASE OF AUTO RESTART FUNCTION

The jumper line is soldered with "JHA (Refer to page 33.)" on the indoor electronic P.C. board.
Remove the auto restart P.C. board from "Connector CN104".

11 TROUBLESHOOTING

MCFH-13NV - E3

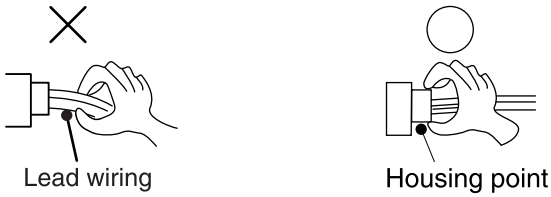
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker.
2) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
3) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.

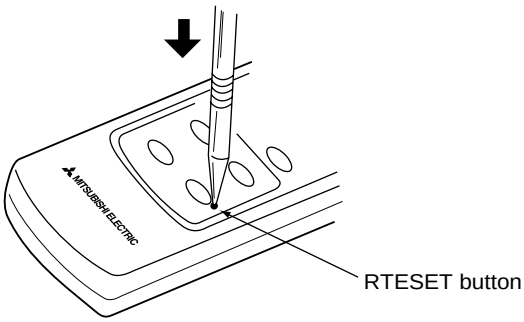


3. Troubleshooting procedure

1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
3) When troubleshooting, refer to the flow chart on page 27 and the check table on page 28.

4. How to replace batteries

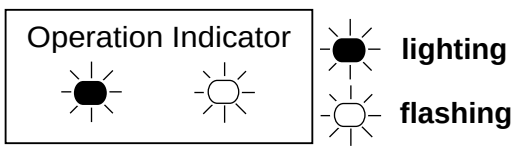
Weak batteries may cause the remote controller malfunction.
In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.
This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.



NOTE: INFORMATION FOR MULTI SYSTEM AIR CONDITIONER (OUTDOOR UNIT : MXZ-32RV-E1)

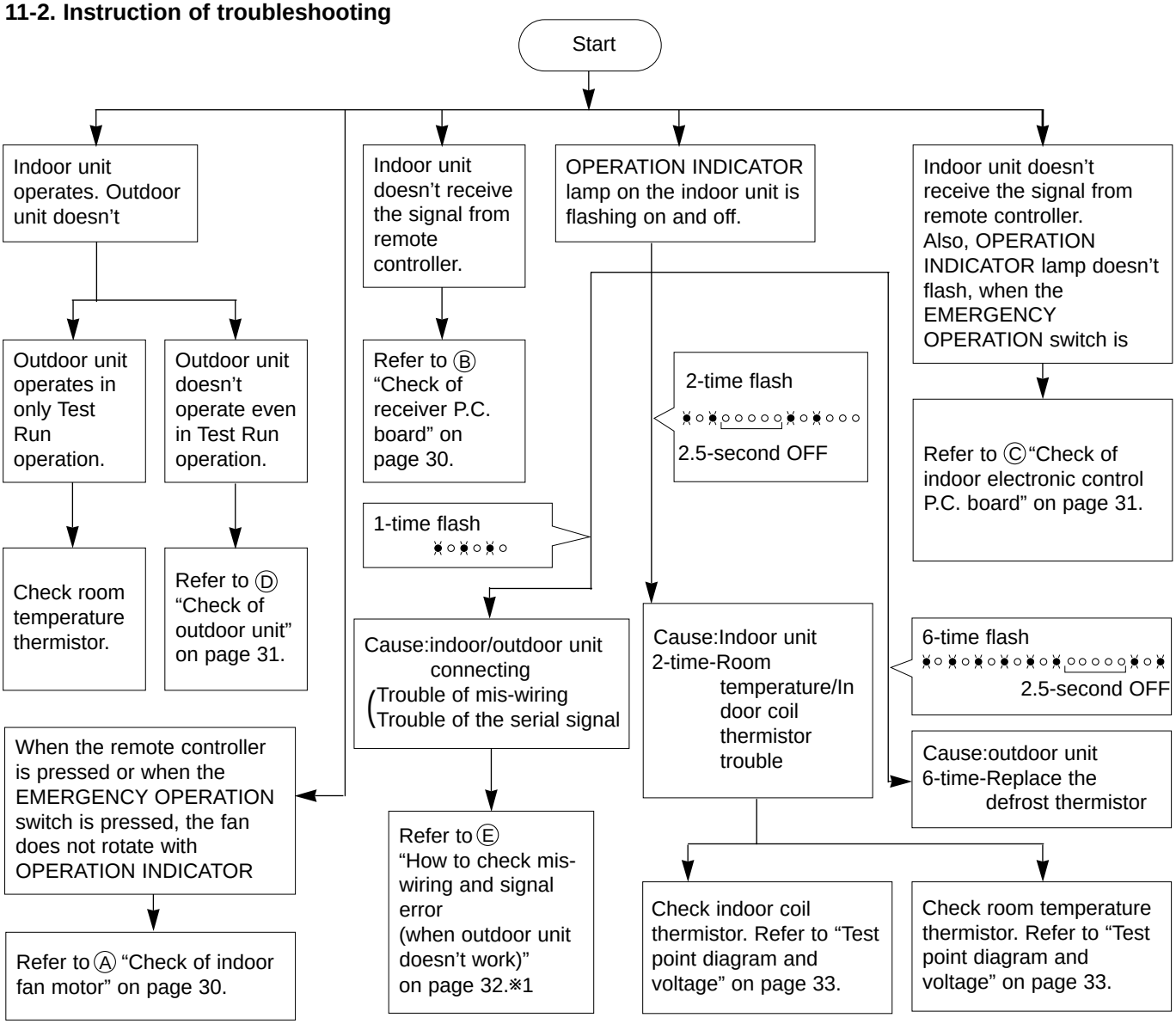
Multi system air conditioner (Outdoor unit: MXZ-32RV-E1) can connect two or more indoor units with one outdoor unit. According to the capacity, two or more units can operate simultaneously.

- When you try to operate two or more indoor units with one outdoor unit simultaneously, one for the cooling and the other for heating, the operation mode of the indoor unit that operates earlier is selected. The other indoor units that will start the operation later cannot operate, indicating as shown in the figure below. In this case, set all the indoor units to the same operation mode.



- When indoor units starts the operation while the defrosting of outdoor unit is being done, it takes a few minutes (max. 10 minutes) to blow out the warm air.
- In the heating operation, though indoor unit that does not operate may get warm or the sound of refrigerant flowing may be heard, they are not malfunction. The reason is that the refrigerant continuously flows into it.

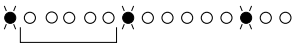
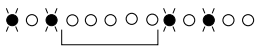
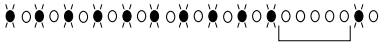
11-2. Instruction of troubleshooting


Start
Indoor unit operates. Outdoor unit doesn't
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Check room temperature thermistor.
Refer to Ⓓ "Check of outdoor unit" on page 31.
When the remote controller is pressed or when the EMERGENCY OPERATION switch is pressed, the fan does not rotate with OPERATION INDICATOR
Refer to Ⓐ "Check of indoor fan motor" on page 30.
Indoor unit doesn't receive the signal from remote controller.
Refer to Ⓑ "Check of receiver P.C. board" on page 30.
OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
1-time flash
Cause:indoor/outdoor unit connecting
(Trouble of mis-wiring
Trouble of the serial signal
Refer to Ⓔ "How to check mis-wiring and signal error (when outdoor unit doesn't work)" on page 32.※1
2-time flash
2.5-second OFF
Cause:Indoor unit 2-time-Room temperature/Indoor coil thermistor trouble
Check indoor coil thermistor. Refer to "Test point diagram and voltage" on page 33.
Indoor unit doesn't receive the signal from remote controller. Also, OPERATION INDICATOR lamp doesn't flash, when the EMERGENCY OPERATION switch is
Refer to Ⓒ "Check of indoor electronic control P.C. board" on page 31.
6-time flash
2.5-second OFF
Cause:outdoor unit 6-time-Replace the defrost thermistor
Check room temperature thermistor. Refer to "Test point diagram and voltage" on page 33.

※1<The case of the trouble of the serial signal>
When the power is turned off and then turned on again, the indication shows "the trouble of mis-wiring".

1. troubleshooting check table

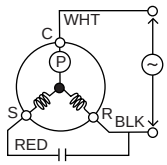
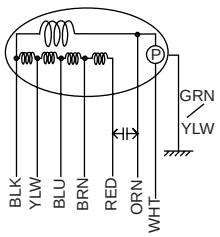
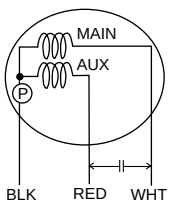
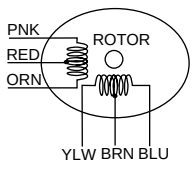
※ Before taking measures, make sure that the symptom reappears, for accurate troubleshooting.
Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Mis-wiring	0.5-second ON 0.5-second OFF	Outdoor unit does not run.	When serial signal stops for 4 to 5 seconds after 1st on of 52C relay by POWER turning on.	● Check switch SW2-②.(MU type or MUH type) ● Check wiring (visual check and conductivity check). ● Check indoor electronic control P.C.board. ● Check outdoor DEICER P.C. board. ● Check electrical parts.
	Serial signal	1-time flash  2.5-second OFF		When serial signal from outdoor unit stops for 4 to 5 seconds.	
2	Indoor coil thermistor Room temperature thermistor	2-time flash  2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	● Check resistance of thermistor. ● Reconnect connector. ● Check indoor electronic control P.C.board.
3	Outdoor power system ✵	5-time flash 2.5-second OFF	Outdoor unit does not run	When compressor has stopped due to over current protection or start-up failure protection 3 times in a row within 1 min. after start-up.	● Check inverter and compressor.
4	Defrost thermistor	6-time flash 2.5-second OFF	Outdoor unit does not run	When the defrost thermistor shorts or opens after the compressor start-up.	● Check outdoor DEICER P.C. board.(MUH) ● Check outdoor control P.C. board. (MXZ) ● Check resistance of thermistor. ● Reconnect connector.
5	Out door control system error ✵	7-time flash 2.5-second OFF	Outdoor unit does not run		● Check outdoor control P.C. board.
6	Out door refrigerant system error ✵	10-time flash  2.5-second OFF	Outdoor unit does not run	When the compressor operation has been interrupted by LEV protection continuously 5 times, the compressor stops operation.	● Amount of gas. ● Outdoor control P. C. board. ● Contact of LEV board connectors.

✵Those indications are shown only when the indoor unit connects with the outdoor unit MXZ-32RV-E1.

2. Trouble criterion of main parts

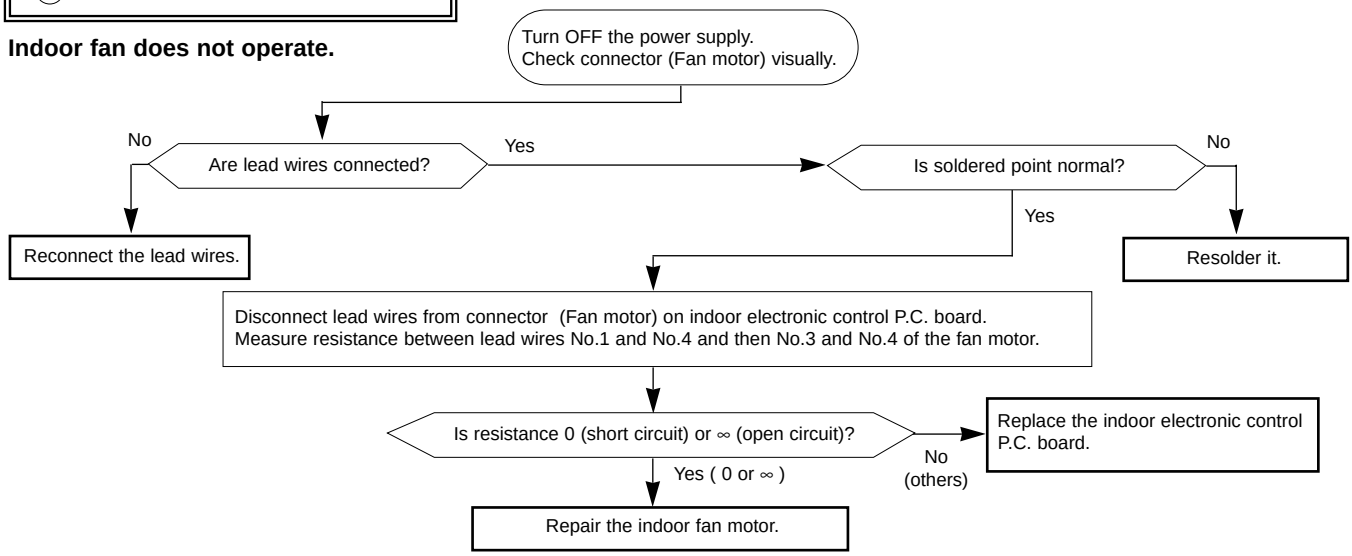
MCFH-13NV -E3

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Room temperature thermistor
Indoor coil thermistor</td><td>Measure the resistance with a tester.
(Part temperature 10°C ~ 30°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>8kΩ ~ 20kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Defrost thermistor</td><td>Measure the resistance with a tester.
(Part temperature -10°C ~ 40°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5kΩ ~ 60kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Compressor</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature -10°C ~ 40°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>C-R</td><td>1.86~2.28Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>C-S</td><td>3.50~4.29Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Indoor fan motor</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature10°C ~ 30°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>175~190Ω</td><td rowspan="5">Opened or short-circuited</td></tr><tr><td>BLK-YLW</td><td>66.1~71.6Ω</td></tr><tr><td>YLW-BLU</td><td>45.6~49.4Ω</td></tr><tr><td>BLU-BRN</td><td>30.2~32.7Ω</td></tr><tr><td>BRN-RED</td><td>21.9~23.8Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature -10°C ~ 40°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>155 ~ 191Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>363 ~ 445Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Vane motor</td><td>Measure the resistance between the terminals with a tester.
(Part temperature10°C ~ 30°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>Resistant per phase</td><td>329~357Ω</td><td>Opened or short-circuited</td></tr></table></td><td> 
</td></tr>
</table>

Ⓟ: INNER THERMOSTAT

Ⓐ Check of indoor fan motor

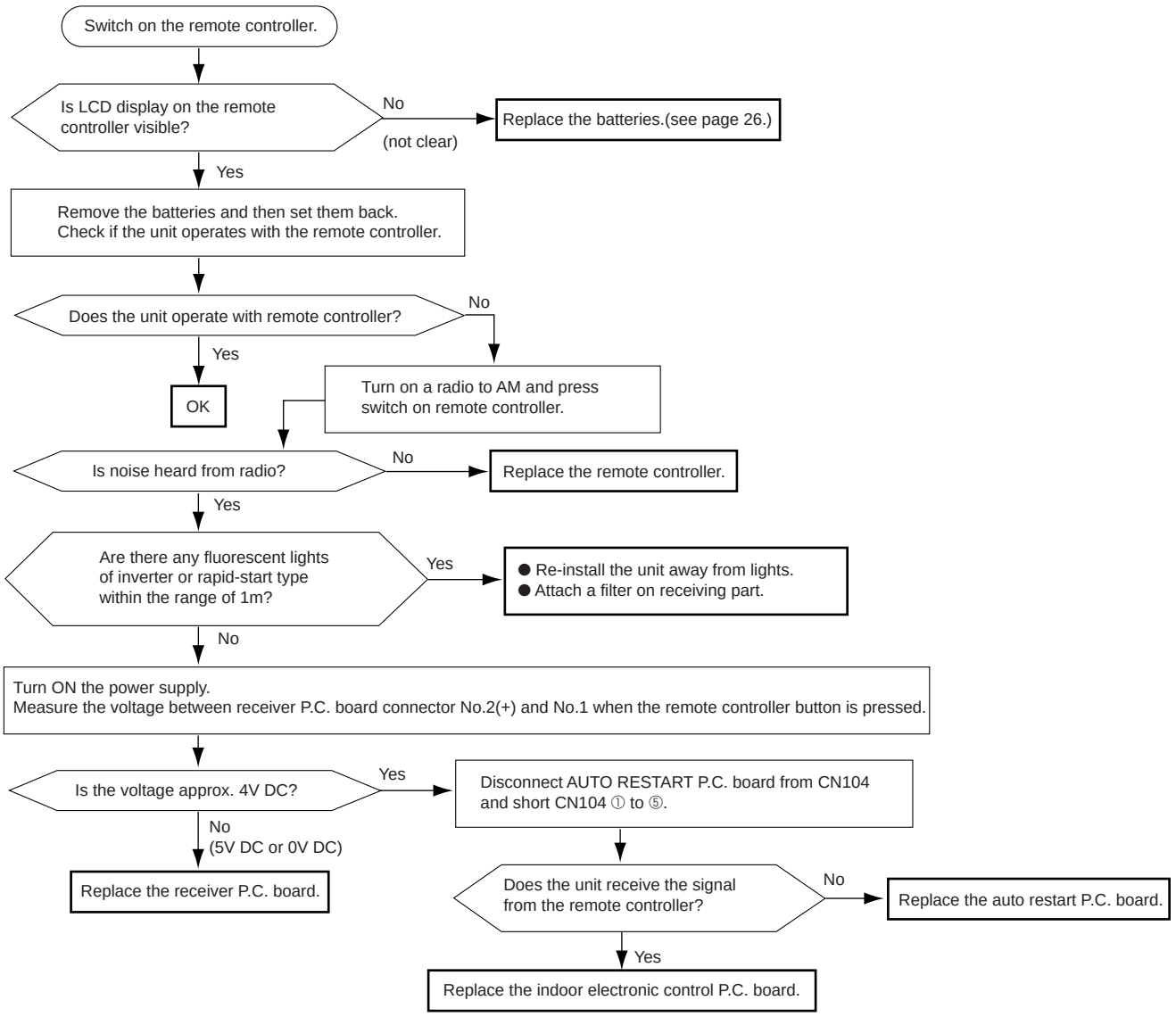
Indoor fan does not operate.


Turn OFF the power supply.
Check connector (Fan motor) visually.
Are lead wires connected?
No
Yes
Is soldered point normal?
No
Yes
Reconnect the lead wires.
Resolder it.
Disconnect lead wires from connector (Fan motor) on indoor electronic control P.C. board.
Measure resistance between lead wires No.1 and No.4 and then No.3 and No.4 of the fan motor.
Is resistance 0 (short circuit) or ∞ (open circuit)?
No
(others)
Replace the indoor electronic control P.C. board.
Yes (0 or ∞)
Repair the indoor fan motor.

Ⓑ Check of remote controller and receiver P.C. board

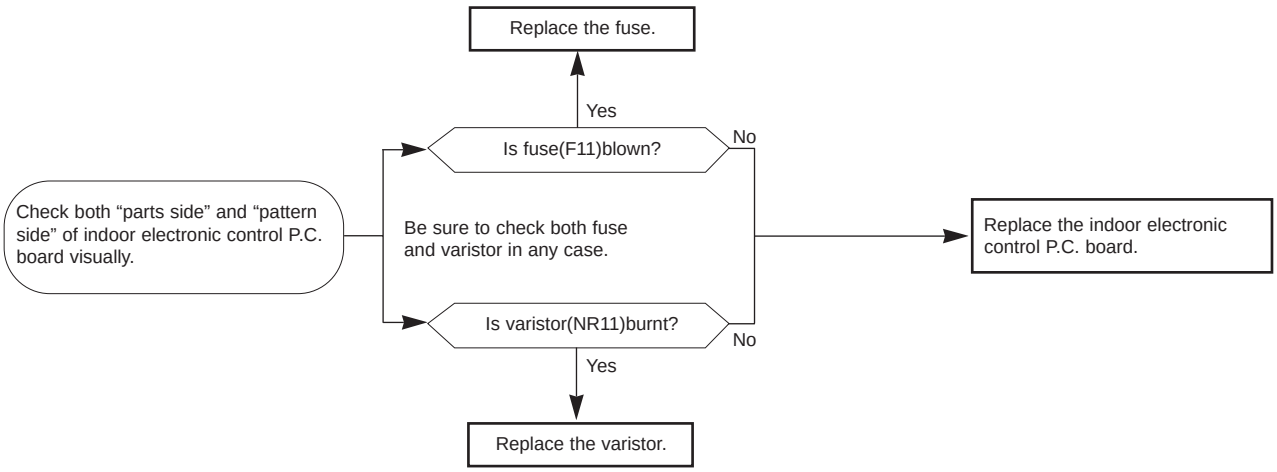
Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.

※Check if the remote controller is exclusive for this air conditioner.


Switch on the remote controller.
Is LCD display on the remote controller visible?
No
(not clear)
Replace the batteries.(see page 26.)
Yes
Remove the batteries and then set them back.
Check if the unit operates with the remote controller.
Does the unit operate with remote controller?
No
Yes
OK
Turn on a radio to AM and press switch on remote controller.
Is noise heard from radio?
No
Replace the remote controller.
Yes
Are there any fluorescent lights of inverter or rapid-start type within the range of 1m?
Yes
● Re-install the unit away from lights.
● Attach a filter on receiving part.
No
Turn ON the power supply.
Measure the voltage between receiver P.C. board connector No.2(+) and No.1 when the remote controller button is pressed.
Is the voltage approx. 4V DC?
Yes
Disconnect AUTO RESTART P.C. board from CN104 and short CN104 ① to ⑤.
No
(5V DC or 0V DC)
Replace the receiver P.C. board.
Does the unit receive the signal from the remote controller?
No
Replace the auto restart P.C. board.
Yes
Replace the indoor electronic control P.C. board.

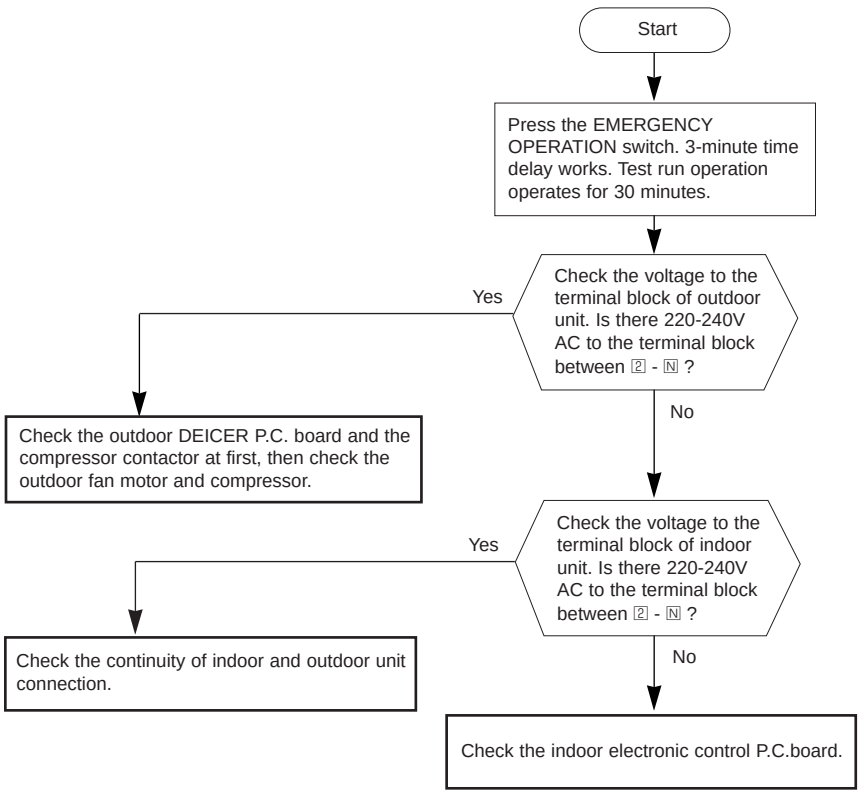
ⓒCheck of indoor electronic control P.C. board

The unit doesn't operate with the remote controller.
Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.

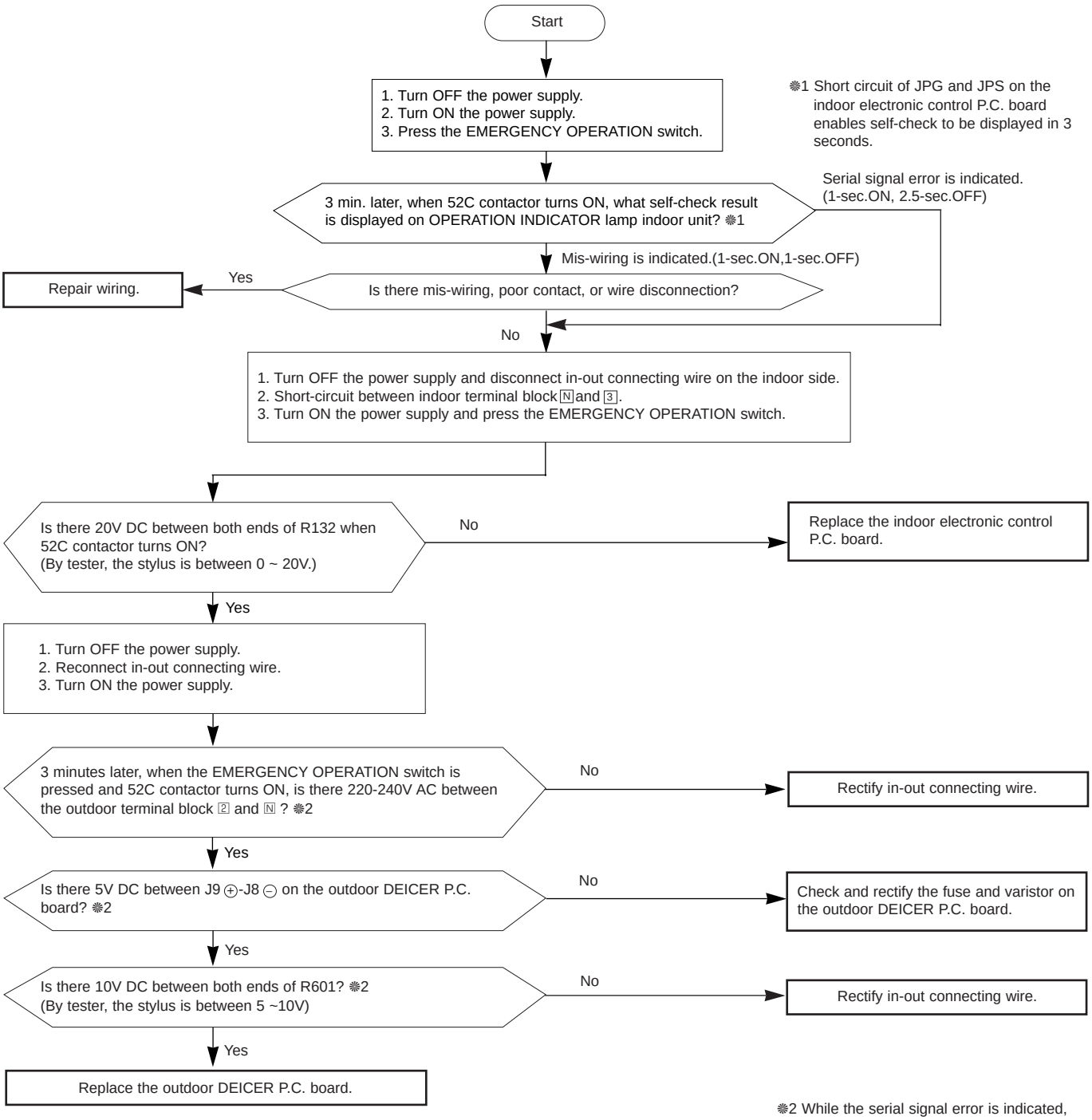

Replace the fuse.
Yes
Is fuse(F11)blown?
No
Check both "parts side" and "pattern side" of indoor electronic control P.C. board visually.
Be sure to check both fuse and varistor in any case.
Replace the indoor electronic control P.C. board.
Is varistor(NR11)burnt?
No
Yes
Replace the varistor.

ⓓCheck of outdoor unit

Compressor and outdoor fan do not operate.


Start
Press the EMERGENCY OPERATION switch. 3-minute time delay works. Test run operation operates for 30 minutes.
Check the voltage to the terminal block of outdoor unit. Is there 220-240V AC to the terminal block between 2 - N ?
Yes
No
Check the outdoor DEICER P.C. board and the compressor contactor at first, then check the outdoor fan motor and compressor.
Check the voltage to the terminal block of indoor unit. Is there 220-240V AC to the terminal block between 2 - N ?
Yes
No
Check the continuity of indoor and outdoor unit connection.
Check the indoor electronic control P.C.board.

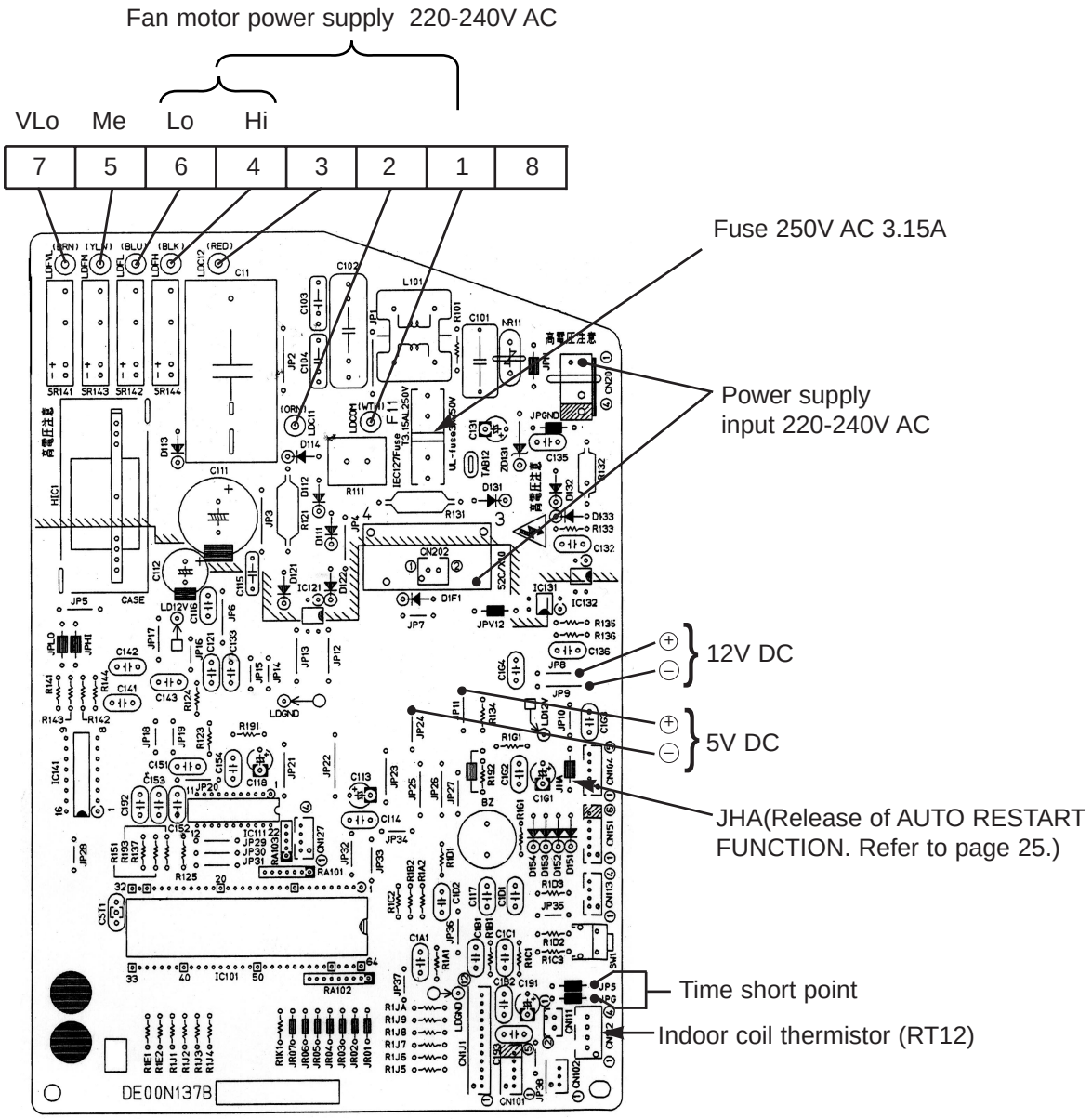
Ⓔ How to check mis-wiring and serial signal error (when outdoor unit does not work)

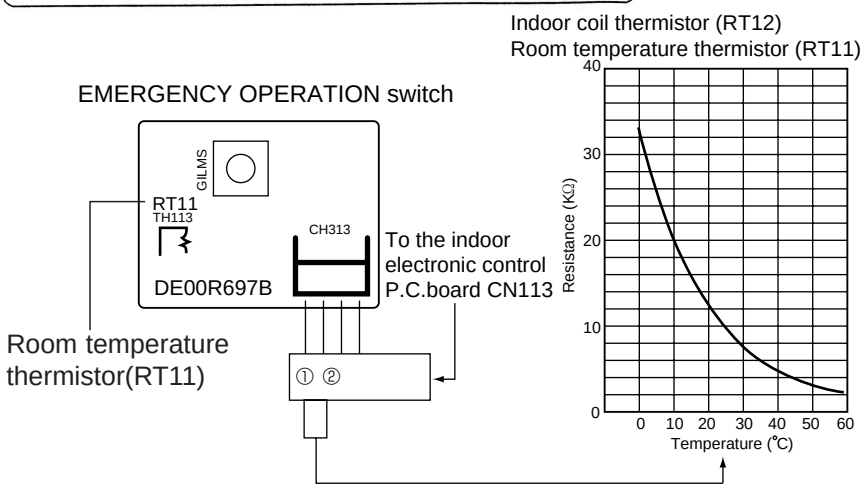

Start
1. Turn OFF the power supply.
2. Turn ON the power supply.
3. Press the EMERGENCY OPERATION switch.
※1 Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self-check to be displayed in 3 seconds.
3 min. later, when 52C contactor turns ON, what self-check result is displayed on OPERATION INDICATOR lamp indoor unit? ※1
Serial signal error is indicated. (1-sec.ON, 2.5-sec.OFF)
Mis-wiring is indicated.(1-sec.ON,1-sec.OFF)
Is there mis-wiring, poor contact, or wire disconnection?
Yes
Repair wiring.
No
1. Turn OFF the power supply and disconnect in-out connecting wire on the indoor side.
2. Short-circuit between indoor terminal block N and 3.
3. Turn ON the power supply and press the EMERGENCY OPERATION switch.
Is there 20V DC between both ends of R132 when 52C contactor turns ON?
(By tester, the stylus is between 0 ~ 20V.)
No
Replace the indoor electronic control P.C. board.
Yes
1. Turn OFF the power supply.
2. Reconnect in-out connecting wire.
3. Turn ON the power supply.
3 minutes later, when the EMERGENCY OPERATION switch is pressed and 52C contactor turns ON, is there 220-240V AC between the outdoor terminal block 2 and N ? ※2
No
Rectify in-out connecting wire.
Yes
Is there 5V DC between J9 ⊕-J8 ⊖ on the outdoor DEICER P.C. board? ※2
No
Check and rectify the fuse and varistor on the outdoor DEICER P.C. board.
Yes
Is there 10V DC between both ends of R601? ※2
(By tester, the stylus is between 5 ~10V)
No
Rectify in-out connecting wire.
Yes
Replace the outdoor DEICER P.C. board.

※2 While the serial signal error is indicated, 52C contactor alternates ON for about 10 seconds and OFF for 3 minutes.
Measure the voltage when 52C contactor is ON.

TEST POINT DIAGRAM AND VOLTAGE
MCFH-13NV - E3

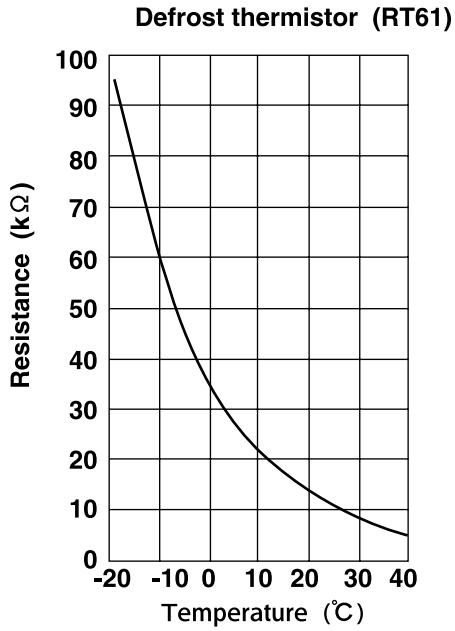
Indoor electronic control P.C. board

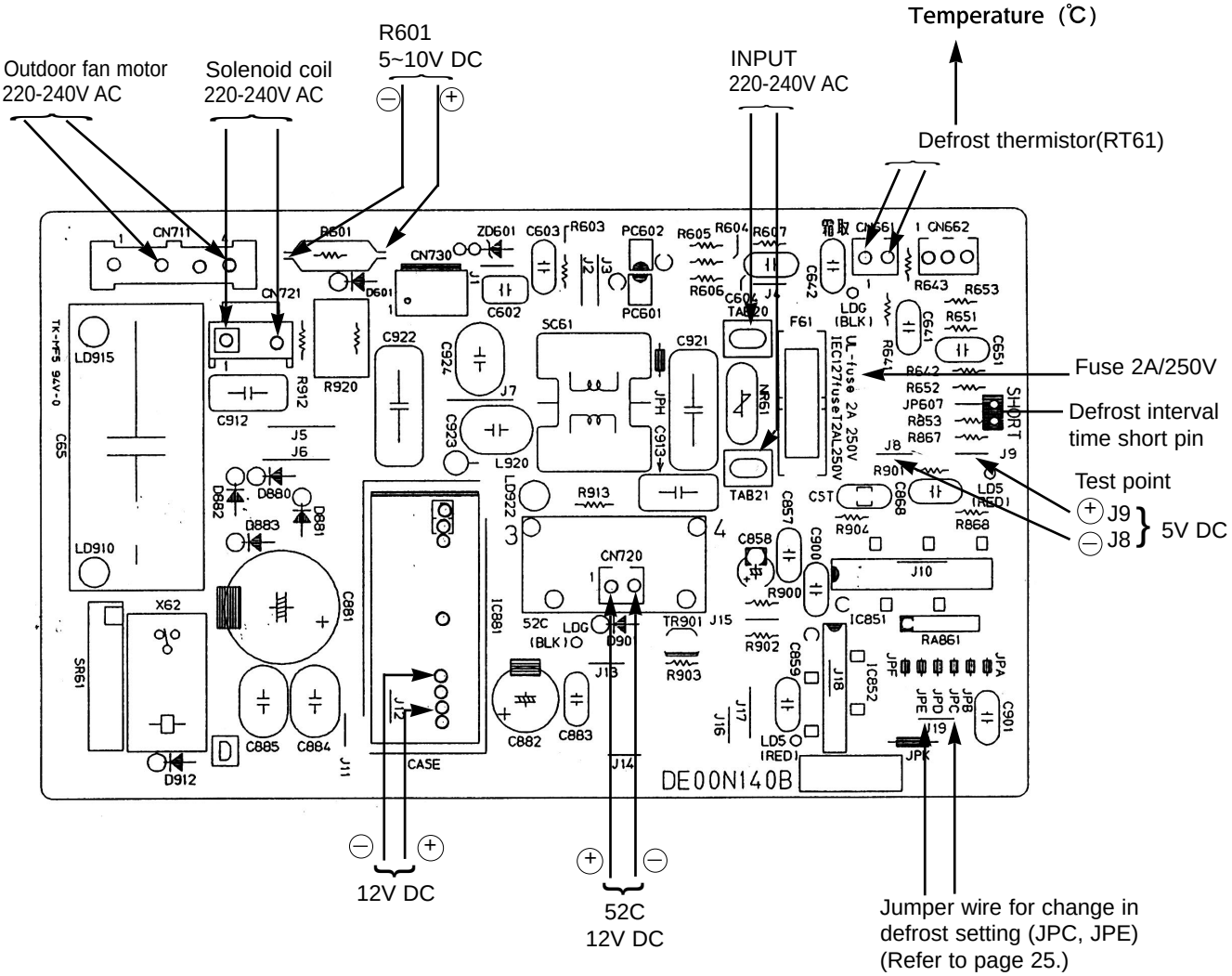




MUCFH-13NV - E3

Outdoor deicer P.C. board



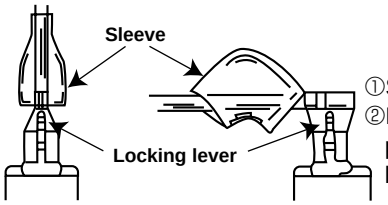


12 DISASSEMBLY INSTRUCTIONS

<"Terminal with lock mechanism" Detaching points>

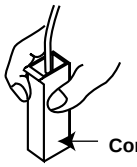
In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



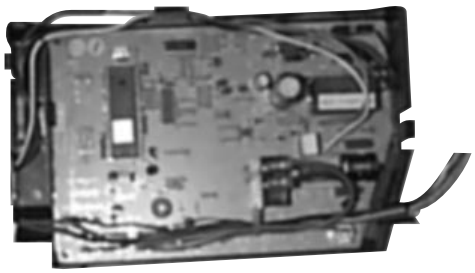
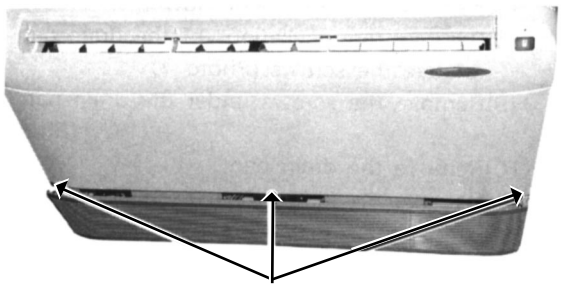
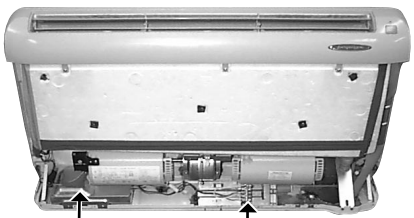
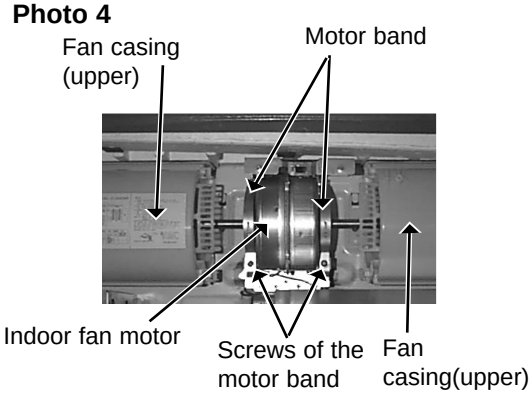
①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

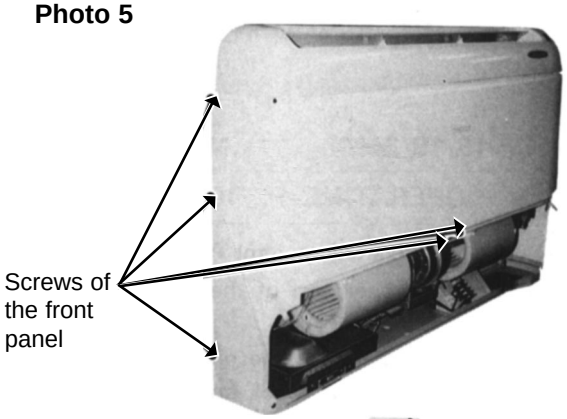
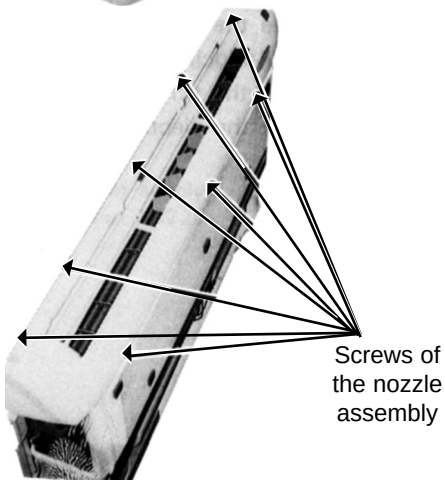
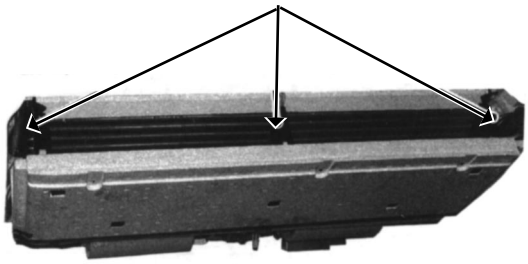
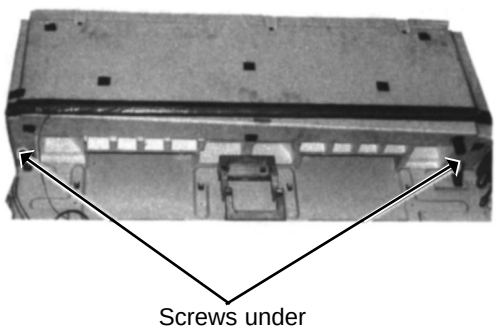
(2) The terminal with this connector is a terminal with lock mechanism



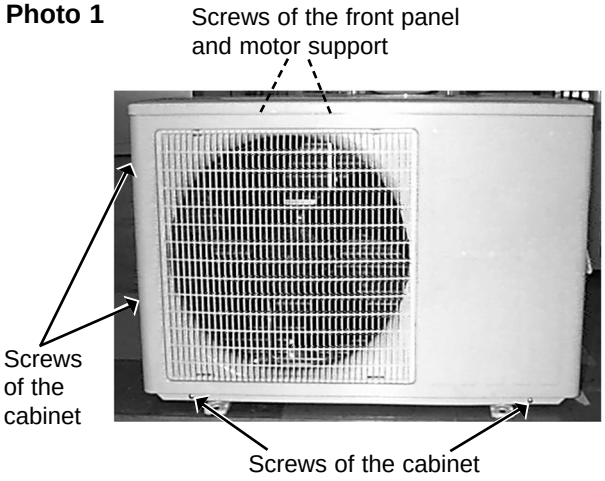
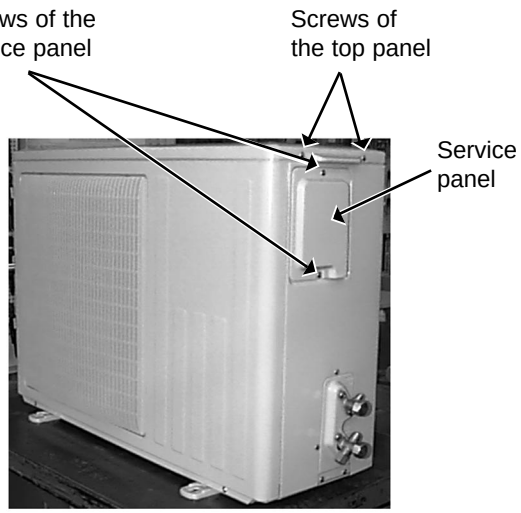
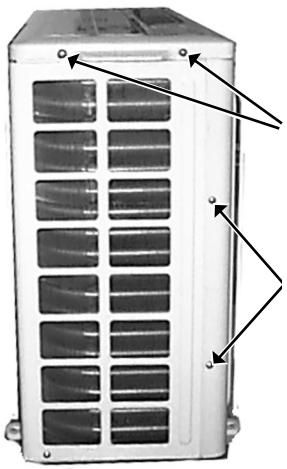
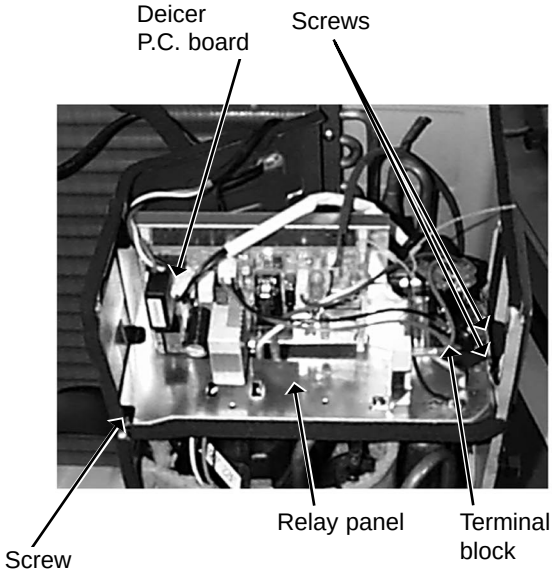
①Hold the sleeve, and pull out the terminal slowly.

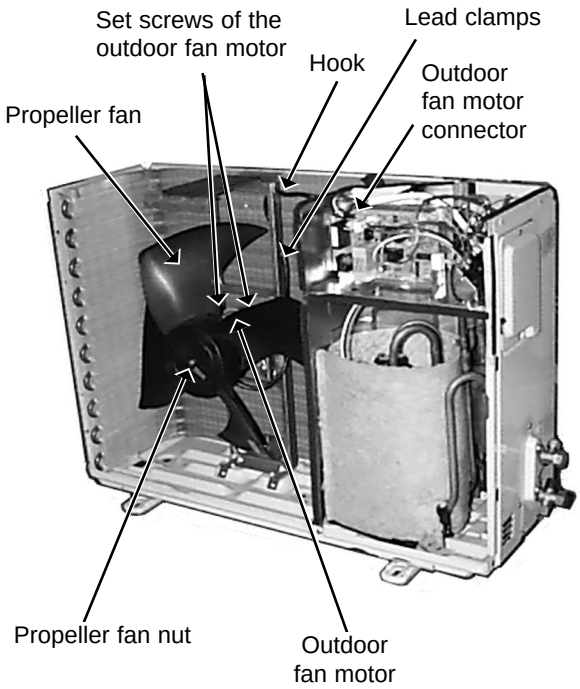
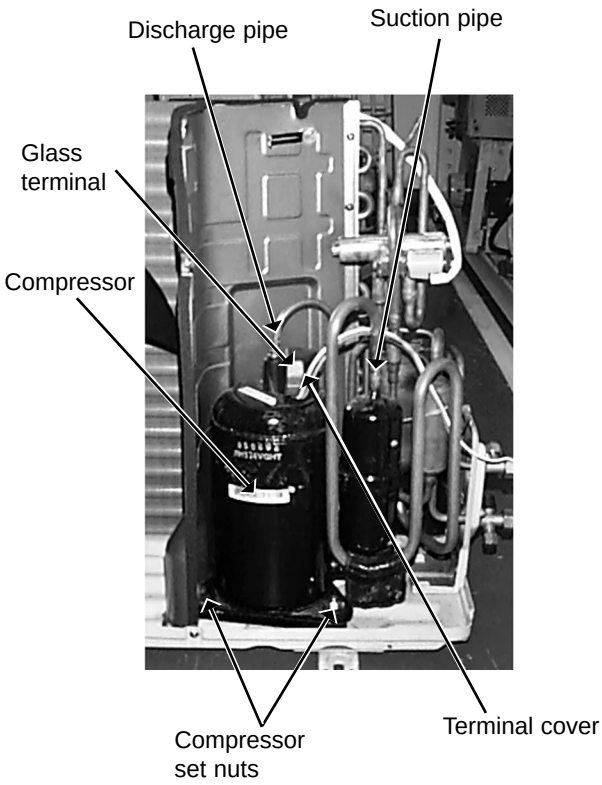
12-1. MCFH-13NV - E3 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the electronic control P.C . board. (1) Pull out the upper part of the grill. (Photo 1) (2) Remove the screws of the grill. (3) Remove screws of terminal block cover. Remove the terminal block cover and remove the terminal block. (4) Remove the screws of the electronic box cover. (5) Pull out the electronic control P.C. board. **Photo 3** 	**Photo 1**  Screws of the grill **Photo 2**  Electronic box Terminal box
2. Removing the indoor fan motor (1) Remove the grill. (Refer to 1(1) (2)) (2) Remove the screws of the pipe support assembly. (3) Remove the fan casing.(upper). (4) Disconnect the connector of the indoor fan motor. (5) Disconnect the ground wire of the fan motor. (6) Remove the screws of the motor band and remove the catch. (7) Take out the sirocco fan and the indoor fan motor.	**Photo 4**  Fan casing (upper) Motor band Indoor fan motor Screws of the motor band Fan casing(upper)

OPERATING PROCEDURE	PHOTOS
3. Removing the indoor heat exchanger. (1) Remove the grill. (Refer to 1(1) (2)) (2) Remove the screws on both side and in front of the front panel. (Photo 5) (3) Remove the screws of the nozzle assembly. (Photo 6) (4) Remove the electronic box. (Refer to 1) (5) Remove the indoor fan motor. (Refer to 2) (6) Remove the screws of the motor support. (7) Remove the fan casing. (lower) (8) Remove the installations of the drain pan and remove the screws. (Photo 7) (9) Remove the screws under the drain pan.(Photo 8) (10) Remove the drain pan. (11) Remove the indoor heat exchanger.	**Photo 5**  **Photo 6**  **Photo 7**  **Photo 8** 

12-2. MUCFH-13NV - E3
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the top panel. (2) Remove the screws of the service panel. (3) Remove the screws of the cabinet. (4) Remove the screws of the front panel and motor support. (5) Remove the service panel, and remove the screw from the insides. (6) Remove the top panel. (7) Remove the cabinet.	**Photo 1** 
Photo 3  	**Photo 2** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 4** 

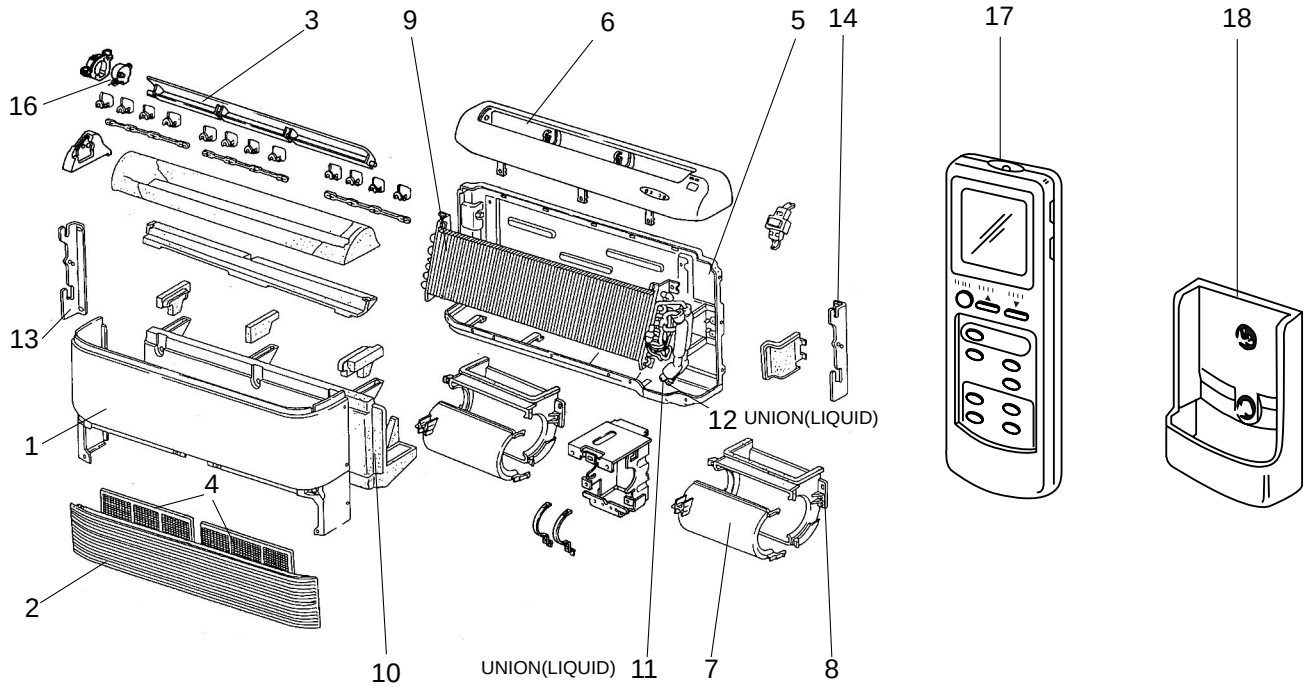
OPERATING PROCEDURE	PHOTOS
3. Removing the propeller fan and the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Remove the propeller fan nut. (3) Remove the propeller fan. **NOTE : Loose the propeller fan in the rotating direction for removal.** When attaching the propeller fan, align the mark on the propeller fan and the motor shaft cut section. Set the propeller fan in position by using the cut on the shaft and the mark on the propeller fan. (4) Remove lead clamps and disconnect the outdoor fan motor connector. (5) Remove screws fixing the fan motor. (6) Remove the outdoor fan motor.	**Photo 5** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the glass terminal of the compressor. (6) Release gas from the refrigerant circuit. (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor. **NOTE** ● Before using a burner, purge gas from the pipes until the pressure gauge shows 0 kg/cm^2. ● Use the burner under the condition that gas can be released even when the inner pressure rises by heat.	**Photo 6** 

13 PARTS LIST

MCFH-13NV -E3 (WH)

13-1. INDOOR UNIT STRUCTURAL PARTS

13-2. ACCESSORY PART AND REMOTE CONTROLLER



13-1. INDOOR UNIT STRUCTURAL PARTS

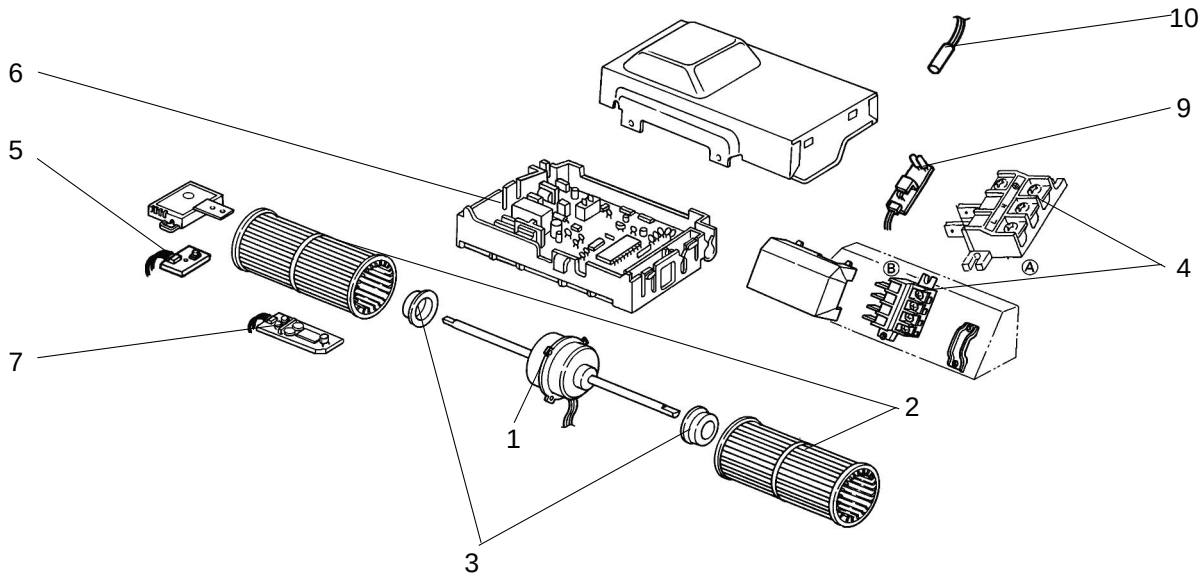
Part number that is circled is not shown in the illustration.

No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit MCFH-13NV-E3 (WH)	Remarks
1	E02 179 000	FRONT PANEL(WH)		1	
2	E02 179 010	GRILLE(WH)		1	
3	E02 227 040	VANE(WH)		1	
4	E02 179 100	AIR FILTER		2	
5	E02 179 231	BACK PANEL(IN)		1	
6	E02 227 235	NOZZLE(WH)		1	
7	E02 179 237	FAN CASING(U)		2	
8	E02 179 238	FAN CASING(L)		2	
9	E02 179 620	INDOOR HERT EXCHANGER		1	
10	E02 215 700	DRAIN PAN		1	
11	E02 179 667	UNION(GAS)		1	ϕ12.7
12	E02 138 667	UNION(LIQUID)		1	ϕ6.35
13	E02 179 971	INSTALLATION METAL L		1	
14	E02 179 972	INSTALLATION METAL R		1	
⑮	E02 179 142	GRILLE CATCH(WH)		3	3PCS/SET
16	E02 227 303	VANE MOTOR	MV	1	

13-2. ACCESSORY PART AND REMOTE CONTROLLER

17	E02 257 426	REMOTE CONTROLLER		1	
18	E02 141 083	REMOTE CONTROLLER HOLDER		1	

13-3. INDOOR UNIT
ELECTRICAL PARTS AND FUNCTIONAL PARTS
MCFH-13NV - E3 (WH)

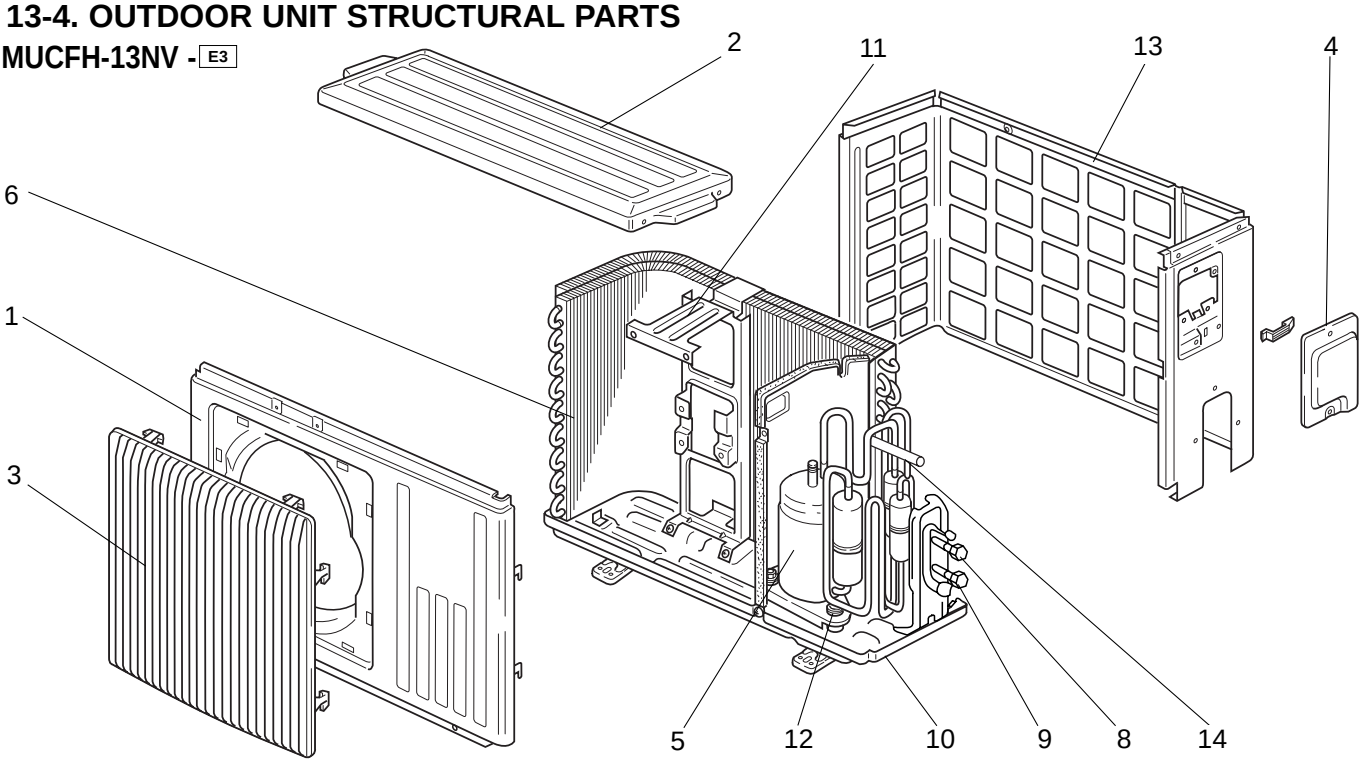


Part numbers that are circled are not shown in the illustration.

No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MCFH-13NV- E3 (WH)	
1	E02 228 300	INDOOR FAN MOTOR	MF	1	RB4V25-□□
2	E02 179 500	SIROCCO FAN		2	
3	E02 179 505	FAN MOTOR RUBBER MOUNT		2	2PCS/SET
4	E02 227 375	TERMINAL BLOCK	TB	1	FigureⒶ
	E02 257 375	TERMINAL BLOCK		1	FigureⒷ
5	E02 215 328	SWITCH & ROOM TEMPERATURE THERMISTOR P.C. BOARD		1	
6	E02 327 450	ELECTRONIC CONTROL P.C. BOARD		1	
7	E02 324 452	AUTO RESTART P.C. BOARD		1	
⑧	E02 127 382	FUSE	F11	1	3.15A
9	E02 227 468	RECEIVER P.C. BOARD		1	
10	E02 327 307	INDOOR COIL THERMISTOR	RT12	1	
⑪	E02 336 385	VARISTOR	NR11	1	

13-4. OUTDOOR UNIT STRUCTURAL PARTS

MUCFH-13NV - E3



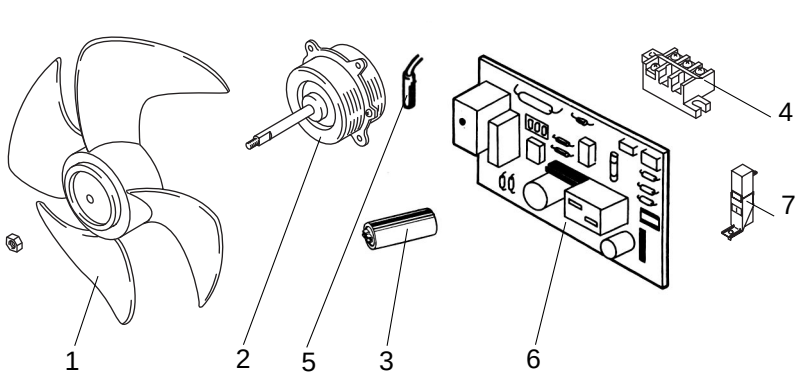
Part number that is circled is not shown in the illustration.

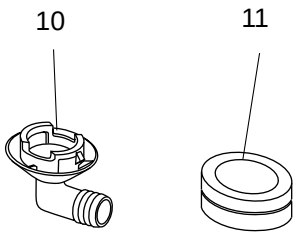
No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUCFH-13NV- E3	
1	E02 336 232	CABINET		1	
2	E02 336 297	TOP PANEL		1	
3	E02 336 521	GRILLE(OUT)		1	
4	E02 336 245	SERVICE PANEL		1	
5	E02 141 900	COMPRESSOR	MC	1	RH-231VHAT
6	E02 442 630	OUTDOOR HEAT EXCHANGER		1	
⑦	E02 156 936	CAPILLARY TUBE		2	ϕ3.0Xϕ1.4X500
	E02 445 936	CAPILLARY TUBE		1	ϕ3.0Xϕ1.8X200
8	E02 139 662	STOP VALVE(LIQUID)		1	ϕ6.35
9	E02 340 661	STOP VALVE(GAS)		1	ϕ12.7
10	E02 340 290	BASE		1	
11	E02 442 515	MOTOR SUPPORT		1	
12	E02 075 506	COMPRESSOR RUBBER SET		3	3RUBBERS/SET
13	E02 440 233	BACK PANEL(OUT)		1	
14	E02 444 961	REVERSING VALVE		1	

MUCFH-13NV - E3

13-5. OUTDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

13-6. ACCESSORY PARTS





13-5. OUTDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part number that are circled are not shown in the illustration.

No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUCFH-13NV- E3	
1	E02 336 501	PROPELLER FAN		1	
2	E02 442 301	OUTDOOR FAN MOTOR	MF	1	RA6V33-□□
3	E02 079 353	COMPRESSOR CAPACITOR	C1	1	30μF/440VAC
4	E02 198 374	TERMINAL BLOCK(OUT)	TB	1	
5	E02 440 310	DEFROST THERMISTOR	RT61	1	
6	E02 445 451	DEICER P.C. BOARD		1	
7	E02 128 383	SURGE ABSORBER	DSAR	1	
(8)	E02 440 490	REVERSING VALVE COIL	21S4	1	
(9)	E02 095 382	FUSE	F61	1	250V 2A

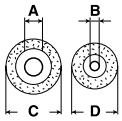
13-6. ACCESSORY PARTS

10	E02 444 704	DRAIN SOCKET		1	
11	E02 444 705	DRAIN CAP		2	

14 OPTIONAL PARTS

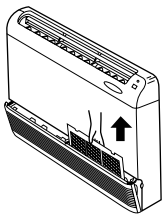
14-1. REFRIGERANT PIPES

The air conditioner has flared connections its indoor and outdoor sides.
Please use the optional extension pipe as follows.

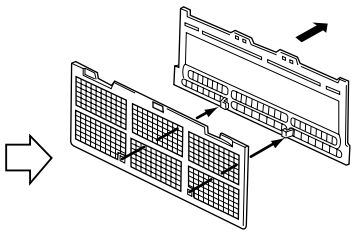
Model	Part No.	Pipe length	Pipe size O.D mm (in.)					Additional refrigerant charge R-22(g)
			Cross-section	A-Gas	B-Liquid	Insulation		
						C	D	
MCFH-13NV- E3	MAC-680PI	3m		ϕ12.7 (1/2)	ϕ6.35 (1/4)	ϕ27	ϕ21	0
	MAC-681PI	5m						
	MAC-682PI	7m						
	MAC-683PI	10m						150
	MAC-684PI	15m						400

14-2. AIR CLEANING FILTER

- If the air cleaning filter is clogged, it may reduce the air conditioner capacity or cause condensation at the air outlet.
- The air cleaning filter is disposable. The standard usable term is about 4 months. However, if the color of the filter turns to dark brown, replace soon.



Remove the air filter and the air cleaning filter together.

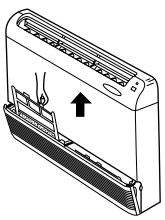


Separate the air cleaning filter (white bellow type) from the air filter.

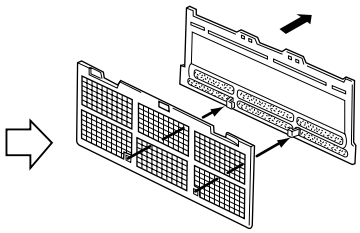
Model	Part No.
MCFH-13NV- E3	MAC-1200FT

14-3. DEODORIZING FILTER

- Clean the filter every two weeks. When it becomes too dirt, clean it more often.
- Replace the filter with a new one when its color can not be restored even after washing or when the filter becomes dark.
- Standard interval for the filter replacement is about 1 year.



Remove the air filter and the deodorizing filter together.



Separate the deodorizing filter (gray sponge type) from the air filter.

Model	Part No.
MCFH-13NV- E3	MAC-1700DF

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